INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live.

Frank O'Bannon
Governor

Lori F. Kaplan
Commissioner

100 North Senate Avenue
P. O. Box 6015
Indianapolis, Indiana 46206-6015
(317) 232-8603
(800) 451-6027
www.IN.gov/idem

May 30, 2003

TO: Interested Parties / Applicant

RE: **Beta Steel Corporation 127-9642-00036**

FROM: Paul Dubenetzky
Chief, Permits Branch
Office of Air Quality

Notice of Decision: Approval - Effective Immediately

Please be advised that on behalf of the Commissioner of the Department of Environmental Management, I have issued a decision regarding the enclosed matter. Pursuant to IC 13-15-5-3, this permit is effective immediately, unless a petition for stay of effectiveness is filed and granted according to IC 13-15-6-3, and may be revoked or modified in accordance with the provisions of IC 13-15-7-1.

If you wish to challenge this decision, IC 4-21.5-3 and IC 13-15-6-1 require that you file a petition for administrative review. This petition may include a request for stay of effectiveness and must be submitted to the Office of Environmental Adjudication, ISTA Building, 150 W. Market Street, Suite 618, Indianapolis, IN 46204, **within (18) eighteen days of the mailing of this notice**. The filing of a petition for administrative review is complete on the earliest of the following dates that apply to the filing:

(1) the date the document is delivered to the Office of Environmental Adjudication (OEA);
(2) the date of the postmark on the envelope containing the document, if the document is mailed to OEA by U.S. mail; or
(3) the date on which the document is deposited with a private carrier, as shown by receipt issued by the carrier, if the document is sent to the OEA by private carrier.

The petition must include facts demonstrating that you are either the applicant, a person aggrieved or adversely affected by the decision or otherwise entitled to review by law. Please identify the permit, decision, or other order for which you seek review by permit number, name of the applicant, location, date of this notice and all of the following:

(1) the name and address of the person making the request;
(2) the interest of the person making the request;
(3) identification of any persons represented by the person making the request;
(4) the reasons, with particularity, for the request;
(5) the issues, with particularity, proposed for consideration at any hearing; and
(6) identification of the terms and conditions which, in the judgment of the person making the request, would be appropriate in the case in question to satisfy the requirements of the law governing documents of the type issued by the Commissioner.

If you have technical questions regarding the enclosed documents, please contact the Office of Air Quality, Permits Branch at (317) 233-0178. Callers from within Indiana may call toll-free at 1-800-451-6027, ext. 3-0178.

Enclosure

FNPER.wpd 8/21/02

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Ken Burns
Beta Steel Corporation
6500 South Boundary Road,
Portage, Indiana 46368

May 30, 2003

Re: A-127-9642
Significant amendment to CP: 127-2326,
Plant ID: 127-00036

Dear Ken Burns:

Beta Steel Coporation was issued a construction permit on February 24, 1992 relating to the operation of the steel manufacturing facility. A request to revise the NOx, SO2 and VOC emission limits on the meltshop and PM-10 and NOx emission limits on the reheat furnace was received on April 02, 1998. The Office of Air Quality (OAQ) has reviewed this request, as detailed in the Technical Support Document, and has amended Operation Conditions of CP-127-2326. Pursuant to 326 IAC 2-2 and IC13-15-7-1 and as explained in the TSD, this permit is amended by this approval and the amended conditions are presented as follows:

1. Changes in the permit conditions:

General Conditions
1. Steel Furnace Meltshop – 1.1 million tons/year steel production capacity
   a. One (1) Electric Arc Furnace (EAF) rated at 135 tons per heat, 151 tons per hour
   b. One (1) Ladle Metallurgy Station rated at 135 tons per heat, 151 tons per hour
   c. One (1) Continuous Caster rated at 151 tons per hour
   d. Three (3) 11.5 MMBTU /hr natural gas fired Ladle Preheat/Holding Stations
   e. One (1) 6 MMBTU/hr natural gas fired Ladle Preheat/Holding Station
   f. One (1) 3.5 MMBTU/hr natural gas fired Tundish Dryout and Preheat Station
   g. One (1) CoJet System including oxy-fuel burners
   h. One (1) Oxy-fuel cutoff torch at the exit end of the continuous caster

Operating Conditions
1. That pursuant to 326 IAC 2-2-3(2), Best Available control Technology (BACT), the EAF shall be controlled by 140,000 acfm direct shell evacuation (DSE) system. The combustion elbow at the DSE shall be designed to provide 200% excess air for the oxidation of CO and other present gaseous pollutants. The furnace shall also be operated within the enclosed meltshop building under the canopy hood. The DSE and canopy hoods shall be ducted to the meltshop baghouse rated at 1.0 million actual cubic feet per minute (MM acfm), demonstrating 100% capture. Pursuant to 326 IAC 2-2 and 6-5, a fugitive dust control and baghouse operation and maintenance program (Attachment A) shall be used to insure optimum compliance with the limitations contained herein. The operation of the furnace shall each be further limited as follows:

PM a. That particulate matter (PM/PM10 where PM-10 includes filterable and condensable components) from the meltshop baghouse stack (exhausting EAF, LMF, Caster and natural gas combustion units) shall be limited to 0.0052

grains per dry standard cubic feet (gr/dscf) and 58.8 pounds per hour (257 tons/year).

b. That all PM/PM10 fugitive emissions generated during furnace operations shall be captured by the roof canopies or contained and collected within the meltshop building.

c. That visible emissions from any building opening as a result of EAF operation shall be limited to 3% opacity based on a six-minute average (24 readings taken in accordance with 40 CFR Part 60, Appendix A, Method 9).

d. That visible emissions shall not be allowed (3% opacity) from any roof building opening as a result of the EAF dust handling system operation based on a six-minute average (24 readings taken in accordance with 40 CFR Part 60, Appendix A, Method 9).

e. That except for scrap steel, slag and raw material handling and storage shall be conducted inside the meltshop.

f. That the above conditions shall satisfy New Source Performance Standards (NSPS), 40 CFR 60, Subpart AAa. Pursuant to that rule, PM/PM10 emissions shall be limited to 0.0052 gr/dscf and 3% opacity at the common baghouse control device, 6% opacity for the meltshop due solely to the operations of the electric furnace, and 10% opacity from the dust handling system based on a six-minute average (24 readings taken in accordance with 40 CFR Part 60, Appendix A, Method 9).

Note: Conditions c and d above impose more stringent restrictions for visible emissions from EAF operations than those specified in the NSPS or 326 IAC 5-1, 6-2, and 6-3.

SO2 g. That total sulfur dioxide (SO2) emissions from the meltshop stack (exhausting EAF, LMF, Caster and natural gas combustion units) shall be limited to 0.33 pounds per ton of steel produced and 49.87 pounds per hour (218.4 tons per year) from the baghouse stack.

CO h. That carbon monoxide (CO) emissions from each EAF shall be reduced through thermal destruction in the direct shell evacuation (DSE) system elbow leading to the baghouse. Total meltshop stack (exhausting EAF, LMF, Caster and natural gas combustion units) CO emissions shall be limited to 817 pounds per hour (3,578.8 tons/year) from the baghouse. Pursuant to 326 IAC 9-1, CO concentrations shall be less than 20% of the maximum one (1) hour National Ambient Air Quality Standards (NAAQS) of 40 milligrams per cubic meter (40,000 ug/m3, 35 ppm). Modeling results indicate that CO will be less than 180 ug/m3 or 0.5% of the NAAQS.

VOC i. That volatile organic compound (VOC) emissions shall be controlled through a scrap management program to eliminate steel scrap with high residual oil content. Beta Steel Corp. shall charge only clean scrap, consistent with the Scrap Management Program detailed in Appendix C (copy enclosed). Combined meltshop processes (consisting of EAF, LMF, Caster and natural gas combustion units) shall be limited to 0.15 pounds of volatile organic emissions per ton of steel produced and 83.2 tons/year from the common stack.

NOx j. That emissions of nitrogen oxides (NOx) from all meltshop operations (consisting of EAF, LMF, Caster and natural gas combustion units) shall be limited to 0.45 pounds per ton of steel produced and 68.58 pounds per hour (300.5 tons/year) through the meltshop stack.

7. That pursuant to 326 IAC 2-2-3 (2) BACT, the Slab Reheat Furnace shall be limited as follows:

a. That only natural gas shall be burned and limited to 264.6 MMBtu/hr heat input.

PM b. That PM/PM-10 (where PM-10 includes filterable and condensable components) emissions shall be limited to 16.3 pounds per million standard cubic feet (lb/MMscf) of natural gas burned and 4.2 pounds per hour (18.5 tons/year).

CO c. That CO emissions shall not exceed 40 lb/MMscf of natural gas burned and 8.5 pounds per hour (37.2 tons/year).

VOC d. That VOC emissions shall not exceed 1.7 lb/MMscf of natural gas burned and 0.4 pounds per hour (1.6 tons/year).

NOx e. That emissions of NOx shall be controlled by NOx control technology consisting of Low-NOx burners and an SCR unit and shall be limited to 77.06 lb/MMscf (0.077 lb/MMBtu) of natural gas burned and 18.88 pounds per hour on a three (3) operating hour average basis, except during periods of startup and shutdown (82.34 tons/year).

The following shall apply during periods of startup and shutdown:

(i) Startup is defined as the duration from the first firing of burners in the Reheat Furnace to the time when the exhaust gas temperature is within the optimum ranges of the operation of control device for NOx emissions.

(ii) Shutdown is defined as the duration from first curtailment of fuel input to the Reheat Furnace burners with the intent of full shutdown to the final complete stop of fuel input and complete cessation of combustion in the Reheat Furnace.

(iii) The Reheat Furnace shall be operated in a manner consistent with good air pollution control and work practices to minimize emissions during startup, and shutdown by operating in accordance with written procedures developed and maintained by the Permittee, which shall include at a minimum the following measures:

1. Review of operating parameters of the unit during startup, or shutdown as necessary to make adjustments to reduce or eliminate excess emissions;
2. Operate emission control equipment as soon as the Reheat Furnace exhaust gas temperature reaches the lower value of the optimum temperature range for the control equipment. This operation shall continue until the time the Reheat Furnace shutdown sequence is initiated with the intention of shutdown of the unit; and
3. Implementation of inspection and repair procedures for the Reheat Furnace and the emissions control equipment prior to attempting startup to ensure proper operation.

14. Stack Test Requirements:

That within 180 days of the start of operation and annually thereafter, emissions testing shall be performed in accordance with 326 IAC 3-2 to determine compliance with:

particulate matter (PM/PM10) emissions limits of Conditions 1a through f , 6 & 7b using EPA Method 5,

VOC limits of Conditions 1i & 7d using Method 25 or Method 25 A,

The Permittee can demonstrate compliance with meltshop VOC emission limit in Condition 1i by calculating 'Total Organic Compounds (TOC)' using 'as carbon' calculation. The Permittee if so desired can subtract the amount of methane observed during the VOC stack test from the TOC to calculate the non-methane VOC emissions to demonstrate compliance with the VOC emissions limit in condition 1i of the permit,

For the testing on the meltshop exhaust to demonstrate compliance with limits contained in the Condition 1, the Permittee shall meet the specifications for stack test protocol as specified in the applicable Method. The Permittee can choose to conduct the stack test in a manner where each test run can consist of up to 2 heats (where each heat lasts approximately one (1) hour) in the EAF at the meltshop.

carbon monoxide (CO) limits of Conditions 1h & 7c using EPA Method 10,

sulfur dioxide (SO2) limits of Conditions 1g using EPA Method 6, and

nitrogen oxides (NOx) limits of Conditions 1j using EPA Method 7.

Within twelve (12) months of effective date of this permit amendment 127-9642-00036, the Permittee shall install, calibrate, certify, operate and maintain a Continuous Emission Monitoring System (CEMS) for NO_X for the reheat furnace stack in accordance with 326 IAC 3-5-2 through 326 IAC 3-5-7.

(a) The CEMS shall measure NO_X emissions rates in pounds per hour to demonstrate compliance with the limitations established in the BACT analysis and set forth in the permit when the reheat furnace is in operation. The Permittee shall measure the amount of natural gas consumed in terms of million cubic feet per hour at the reheat furnace during the operation. To demonstrate compliance with the NO_X limits, the source shall take an average of the pounds of NOx per million cubic feet of natural gas used and pounds of NOx per hour over a three (3) operating hour period. The source shall maintain records of the emissions in pounds of NOx per million cubic feet of natural gas and pounds of NOx per hour.

(b) The Permittee shall determine compliance with Conditions 7e utilizing data from the NO_X CEMS, the fuel flow meter, and Method 19 calculations.

(c) The Permittee shall submit to IDEM, OAQ, within ninety (90) days after monitor installation, a complete written Monitoring Plan.

(d) The Permittee shall record the output of the system and shall perform the required record keeping, pursuant to 326 IAC 3-5-6, and reporting, pursuant to 326 IAC 3-5-7.

Pursuant to 40 CFR 60.47(d), the Permittee shall install, calibrate, certify and operate continuous emissions monitors for carbon dioxide or oxygen at each location where nitrogen oxide emissions are monitored.

The Permittee shall submit the records of excess NO_X emissions (defined in 326 IAC 3-5-7 and 40 CFR Part 60.7) from the continuous emissions monitoring system on a quarterly basis. These reports shall be submitted within thirty (30) calendar days following the end of each quarter to the following address:

Indiana Department of Environmental Management
Compliance Data Section, Office of Air Quality
100 North Senate Avenue, P. O. Box 6015
Indianapolis, Indiana 46206-6015

Note: COM of meltshop baghouse exhaust shall serve to satisfy the annual PM/PM10 test requirement for that stack, unless violations have occurred during the past 12 month period.

The OAQ has also added the following conditions to demonstrate compliance with the revised VOC, SO2 and NOx limitations:

23. That pursuant to 326 IAC 2-2-3(a)(3), the Permittee shall comply with the following throughput limitations:

    a. The maximum short-term metal production capacity from the meltshop shall not exceed 151 tons per hour hour, over period of 24 operating hours rolling average, with compliance demonstrated at the end of each hour; and

    b. The maximum long-term metal production capacity from the meltshop shall not exceed 1,100,000 tons per year.

    Records shall be maintained for a minimum of 60 months and submitted upon request.

2. Pursuant to IC 13-15-5-3, this permit becomes effective upon its issuance. Pursuant to 326 IAC 2-2 (Prevention of Significant Deterioration), 326 IAC 2-1.1-6 (Public Notice), IC 4-21.5-3-7 (Review; Petition; Denial of Petition; Preliminary Hearing) and IC 13-15-6-1 (Objections; request for adjudicator hearing) this approval can be appealed as specified in these provisions.

3. Pursuant to 326 IAC 2-2-8(a)(1) (PSD Requirements: Source Obligation) this permit to construct shall expire if construction is not commenced within eighteen (18) months after receipt of this approval or if construction is discontinued for a continuous period of eighteen (18) months or more, or if construction is not completed within reasonable time. IDEM may extend the eighteen (18) month period upon satisfactory showing that an extension is justified.

All other conditions of the permit CP 127-2326-00036 shall remain unchanged and in effect. Please attach this amendment with the original permit.

Sincerely,

Original signed by Paul Dubenetzky
Paul Dubenetzky, Chief
Permits Branch
Office of Air Quality

GS

cc: File - Porter County
U.S. EPA, Region V
Porter County Health Department
Northwest Regional Office
Air Compliance Section Inspector - Rick Massoels
Compliance Data Section - Karen Nowak
Permit Tracking - Sara Cloe
Technical Support and Modeling - Michele Boner

Indiana Department of Environmental Management
Office of Air Quality

Addendum to the
Technical Support Document (TSD) for a Significant Amendment (Modification) to a Prevention of Significant Deterioration Permit

Source Description and Amendment Request

Source Name:	Beta Steel Corporation
Source Location:	6500 South Boundary Road, Portage, Indiana 46368
County:	Porter
Construction Permit:	127-2326-00036
Amendment No.:	A-127-9642-00036
SIC Code:	3312
Permit Reviewer:	Gurinder Saini

On February 08, 2003, the Office of Air Quality (OAQ) had a notice published in the Vidette Times, Munster, Indiana, stating that Beta Steel Corporation, had applied for revision of the meltshop NOx, SO2 and VOC emissions limits stated in Operation Condition No. 1 of Construction Permit CP-127-2326, issued on February 24, 1992. The Permittee also requested for adjustment of PM-10 and NOx emissions limit for Slab Reheat furnace being controlled by a Selective Catalytic Reduction (SCR) unit. In addition the Permittee is requesting changes to compliance determination method conditions in the permit. The public notice also stated that OAQ proposed to issue the PSD approval for this operation and provided information on how the public could review the proposed approval and other documentation. Finally, the notice informed interested parties that there was a period of thirty (30) days to provide comments on the draft permit.

Written comments were received from Terri A. Czajka of Ice Miller on behalf of Beta Steel on March 7, 2003. These comments and IDEM, OAQ responses, including changes to the permit (where language deleted is shown with ~~strikeout~~ and that added is shown in **bold**) are as follows:

General Description by the commentator

In accordance with the Notice Of 30-Day Period For Public Comment issued on February 5, 2003, by the Indiana Department of Environmental Management ("IDEM"), announcing that the public comment period began on February 8, 2003 and ends on March 8, 2003, Beta Steel Corporation ("Beta") hereby timely submits its written public comments on the above-referenced significant amendment to its Construction Permit under Prevention of Significant Deterioration ("PSD"). Beta acknowledges and appreciates IDEM's assistance in this pending Permit amendment, however, is compelled to submit these comments:

Comment 1:

IDEM proposes to add a requirement that within twelve (12) months Beta install, calibrate, certify, operate, and maintain a Continuous Emission Monitoring System ("CEMS") for Nitrogen Oxide ("NO_X") for the reheat stack furnace in accordance with 326 IAC 3-5-2 through 326 IAC 3-5-7 (Permit Amendment Letter, pages 4-5 of 6). Each and every proposed Permit term and condition related to and arising out of the requirement for a NO_X CEMS is contrary to law, beyond IDEM's authority, an abuse of IDEM's discretion, irrational, arbitrary and capricious, unduly burdensome, and not supported by any facts, for the following reasons:

1. 326 IAC 3-5-1 (a)(1), (b), and (c) is the only law which grants IDEM whatever authority it may have to require installation of a CEMS. Pursuant to 326 IAC 3-5-1(a)(1), a CEMS only may be required for the enumerated list of "affected facilities" set forth in 326 IAC 3-5-1(b). Beta is not on that list. As such, the CEMS requirements set forth in 326 IAC 3-5-1(c) do not apply to Beta.

2. 326 IAC 3-5-1(a)(2) and 3-5-1(d) do not authorize imposition of a CEMS. 326 IAC 3-5-1(a)(2) sets forth the second purpose of 326 IAC 3-5-1, which is to establish "[a] process for developing suitable monitoring requirements for other types of sources." That is, for sources, such as Beta, that are not "affected facilities" listed in 326 IAC 3-5-1(b) for which a CEMS is required. The process for "developing suitable monitoring requirements for other types of sources, " including Beta, apparently is set forth in 326 IAC 3-5-1(d), which provides:

   The department may require, as a condition of a construction or operating permit issued under 326 IAC 2-1, 326 IAC 2-2, 326 IAC 2-3, 326 IAC 2-7, 326 IAC 2-8, or 326 IAC 2-9, that the owner or operator of a new or existing source of air emissions monitor emissions to ensure compliance with the following:

   a) An emission limitation or standard established in one (1) of the permits listed in subsection (d) [this subsection].

   b) Permit requirements.

   c) Monitoring requirements in 326 IAC 7.

   These Subsections (326 IAC 3-5-1(a)(2) and (d)) merely authorize a process for developing suitable monitoring for sources that are not required by 326 IAC 3-5-1(a)(1), (b), and (c) to install a CEMS, as may be necessary to ensure compliance with a permit emissions limitation or standard or other permit condition. They do not authorize a CEMS at all because the only circumstances under which IDEM is authorized to require a CEMS are set forth in 326 IAC 3-5-1(a)(1), (b), and (c), and not in Subsections (a)(2) and (d).

3. 326 IAC 3-5-1(e) does not authorize any monitoring requirement; it only clarifies that 326 IAC 3-5-1 does not restrict IDEM's authority to impose more restrictive requirements, if those more restrictive requirements are required under any other provision of the Clean Air Act, including Section 114 (a)(1), or State statutes, or IDEM regulations. No such more restrictive requirements are applicable to Beta.

   326 IAC 3-5-1(f) also does not authorize any monitoring requirements; it only sets out compliance dates for those "affected facilities" that are regulatorily required to install a CEMS.

   Except for 326 IAC 3-5-1 (a)(1), (b), and (c), there is no regulation or other legal requirement that authorizes IDEM to require a CEMS. Rather, except for those "affected facilities" listed in 326 IAC 3-5-1(b), IDEM may require only monitoring as may be necessary to demonstrate compliance with permit conditions, and that monitoring cannot include a CEMS. As with all permit conditions, monitoring as may be necessary to demonstrate compliance with permit conditions must be rational, supported by facts, consistent with law and IDEM's authority, not unduly burdensome, and neither arbitrary nor capricious. So, even if IDEM somehow had authority under 326 IAC 3-5-1(a)(2) and (d) to require a CEMS (which it does not), it could impose such a requirement only if under Beta's circumstances it were rational, supported by the facts, consistent with law and IDEM's authority, not unduly burdensome, and neither arbitrary nor capricious. IDEM's imposition of a CEMS on Beta (if it has that authority at all, which Beta denies) does not meet that standard.

4. IDEM stated in the Technical Support Document ("TSD") to the significant Permit amendment that a CEMS is being required to monitor NO_X emissions from the reheat furnace in order to demonstrate that the reheat furnace using low NO_X burners and SCR (Selective Catalytic

Reduction) comply with the NO_X emissions limitations. Assuming for the sake of discussion only, that IDEM has authority under 326 IAC 5-1-2(a)(2) and (d) to require Beta to install a CEMS, if such a requirement were rational, supported by the facts, consistent with law, not unduly burdensome, and neither arbitrary nor capricious (which authority IDEM does not have), a CEMS is but one possible method to reach IDEM's stated goal; it is not the only method. Another method, already proposed to IDEM by Beta, is a parametric monitoring program to demonstrate continuous compliance with the NO_X emissions limitations. That program is detailed in Beta's December 23, 2002 letter submitted to IDEM, a copy of which is attached hereto as Attachment A and incorporated as if fully set forth herein. In summary:

Beta's proposed parametric monitoring program includes the daily monitoring of key Selective Catalytic Reduction ("SCR") operating parameters along with an annual stack testing program. The annual stack test would establish compliance with the NO_X emissions limitations for the reheat furnace included in the Permit amendment. The daily parametric monitoring would ensure the continued optimal operation of the SCR unit. The parametric monitoring program also would establish written procedures for the inspection and correction of any out-of-limits conditions for the monitored parameters. These procedures would ensure that any malfunctions of the SCR system that could impact NOx emissions would be rapidly detected and corrected. Statistical process control techniques also would be used on the critical parameters monitored to help detect early trends and conditions prior to an out-of-limits condition for a monitored parameter occurring.

Beta's proposed parametric monitoring achieves all of the 326 IAC 3-5-1(d) monitoring objectives by providing a reasonable demonstration that the system is operating as designed and that it is achieving permitted emissions rates. The proposal meets U.S. EPA monitoring requirements because it is definite, replicable, independently verifiable by stack testing, and enforceable as a practical matter with a shorter compliance period than the 12-month rolling average presumptively allowed under U.S. EPA guidelines. Finally, the periodic stack test provides a further assurance of compliance and an independent measure of system reliability.

The parametric monitoring program proposed by Beta will provide IDEM and Beta with more than sufficient information to ensure continuous compliance with the NO_X limitations. IDEM has not identified any additional meaningful information in this regard that would be provided by a CEMS. Further, per quotations from vendors, the cost of a CEMS is approximately $250,000 (quotation attached hereto as Attachment B). Additionally, there will be increased maintenance, repair, testing, and administrative costs associated with the CEMS requirements. Beta reasonably estimates that the cost to modify its current monitoring system to meet the requirements of its proposed parametric monitoring system is less than $25,000 to $30,000. It is an abuse of discretion, contrary to law, arbitrary and capricious, irrational, not supported by the facts, and unduly burdensome to require Beta to expend over $200,000 for little or no additional environmental benefit and IDEM's TSD does not include any factual or legal rationale to support such a requirement.

5. It appears that IDEM is attempting to implement a non-rule, unpublished policy requiring that every facility (or at least every facility that produces steel) with a SCR install a CEMS. See, e.g., Nucor Steel PSD Permit, Significant Source Modification No. 107-14297-00038, and supporting TSD and Addendum thereto, issued June 6, 2002, and related petitions for review challenging requirement for a CEMS (Beta hereby incorporates as if fully attached hereto IDEM's public records related to Nucor's June 6, 2002 modified Permit). If IDEM is implementing a non-rule, unpublished policy by requiring a CEMS on SCRs, it is acting contrary to law and beyond its authority, irrationally, arbitrarily and capriciously, and without any factual basis. A blanket requirement that a CEMS be installed on all SCRs must be promulgated as a rule before it may be implemented by IDEM.

6. IDEM has provided absolutely no rationale, factual basis, or legal basis for requiring Beta to install a CEMS. As such, if in issuing the Permit amendment IDEM does attempt to provide bases for this requirement, Beta will have had no opportunity to raise related issues and thus will be

deprived of its due process rights.

Response 1:

The requirements to install Continuous Emissions Monitoring Systems stems from the long-standing policy of U.S.EPA as described in New Source Review, Workshop Manual[1] (Draft) (NSR Manual). This document is the guiding force for implementing the PSD program and review issues, and is held in high esteem by Environmental Appeals Board (EAB) of U.S.EPA, the appellate authority for the PSD approvals issued by U.S.EPA and the delegated state agencies. The EAB has stated in a decision for Metcalf Energy Center[2], that "In 1990, EPA issued draft guidance for permitting authorities to use in, among other things, analyzing PSD requirements. *See* U.S. EPA, Office of Air Quality Planning & Standards, *New Source Review Workshop Manual* (draft Oct. 1990) ("*NSR Manual*"). Although it is not accorded the same weight as a binding Agency regulation, the NSR Manual **has been considered by this Board to be a statement of the Agency's thinking on certain PSD issues**. *See*, *e.g.*, *In re Tondu Energy Co.*, PSD Appeal Nos. 00-05 & 00-07, slip op. at 13 n.13 (EAB Mar. 28, 2001),10 E.A.D. ___ [emphasis added]."

In the NSR Manual[3] on page B.56 it is stated that "**BACT emission limits** or conditions **must be met on a continual basis at all levels of operation** (e.g., limits written in pounds/MMbtu or percent reduction achieved), demonstrate protection of short term ambient standards (limits written in pounds/hour) and **be enforceable as a practical matter** (contain appropriate averaging times, **compliance verification procedures and record keeping requirements**) [emphasis added]." It is further stated that "..the permit must.. specify a reasonable averaging time consistent with established reference methods, contain reference methods for determining compliance, and **provide for adequate reporting and record-keeping so that the permitting agency can determine the compliance status of the source** [emphasis added]."

On page H.6 of the NSR Manual in the chapter 'Elements of an Effective Permit' it is stated that "The permit should state **how compliance with each limitation will be determined**, and include, but is not limited to, the test method(s) approved for demonstrating compliance. These permit compliance conditions must be **very clear and enforceable as a practical matter** (see Appendix C)." In addition in table H.2 on page H.10 it is stated that "Continual and continuous ***emissions performance monitoring*** and recordkeeping (direct and/or surrogate) should be specified where feasible [emphasis in original]. " Further on page c.4 in Appendix C of the same manual it is stated that "**Emissions limits should reflect operation of the control equipment**, be short term, and, where feasible, the **permit should require a continuous emissions monitor**."

In a guidance memo[4] on this subject US EPA has stated that, "The particular circumstances of some individual sources make it difficult to state operating parameters for control equipment limits in a manner that is easily enforceable as a practical matter. Therefore, there are two exceptions to the absolute prohibition on using blanket emission limits to restrict potential to emit. If the permitting agency determines that setting operating parameters for control equipment is infeasible in a particular situation, a federally **enforceable permit containing short term emission limits** (e.g. lbs per hour) would be sufficient to limit potential to emit, provided that such limits reflect the operation of the control equipment, and **the permit includes requirements to install, maintain, and operate a continuous emission monitoring (CEM) system and to retain CEM data**, and specifies that CEM data may be used to determine compliance with the emission limit."

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[1] "New Source Review Workshop Manual, Prevention of Significant Deterioration and Non-Attainment Area Permitting", by US EPA, Draft – October 1990.

[2] See, EAB decision for Metcalf Energy Center "In re Metcalf Energy Center PSD Appeal No. 01-07 and 01-08 footnote 9 at 11 (EAB, August 10, 2001)".

[3] See Chapter B, "Enforceability of BACT" in the, "New Source Review Workshop Manual", by US EPA, Draft – October 1990.

[4] See, Memorandum from Terrell E. Hunt, Associate Enforcement Counsel, Air Enforcement Division, Office of Enforcement and Compliance Monitoring, and Stationary Source Compliance Division Office Of Air Quality Planning And Standards, US EPA in "Limiting Potential To Emit In New Source Permitting" – June 13, 1989.

The EAB in an order denying review[1], restated reviewing agency (in this case IDEM)'s position about the requirements for installation of CEMs. It stated in its decision that, "…IDEM argued that CEMs are required only where: (1) a control device is used; (2) information on emissions is limited; and (3) emissions could adversely affect air quality…" The EAB in the order did not question validity of any of these aspects for the requirements to install CEMs to show compliance.

The rule cited in the comment 326 IAC 3-5-1 (d) authorizes the IDEM, OAQ to require the emissions monitoring from a source to ensure compliance with the emissions limits established in the permits issued pursuant to 326 IAC 2-2 (Prevention of Significant Deterioration). In addition under the same rule, the IDEM, OAQ is authorized to require emissions monitoring to ensure compliance with the permit requirement. Therefore, pursuant to this provision, the department has full authority to impose conditions requiring emissions monitoring systems for the reheat furnace.

The Beta reheat furnace uses a Selective Catalytic Reduction (SCR) system to control the NOx emissions. There is a large uncertainty about the emission rates from this process as can be seen in the past stack tests conducted at this source. These tests show large variations in the emission rates over the years. Therefore, the IDEM, OAQ firmly believes that use of NOx CEMs to demonstrate compliance, with the NOx limit in the permit as BACT, using the SCR system, as a control is appropriate and consistent with the U.S.EPA policy and other regulations. This method is the only reasonable method for demonstrating compliance and is 'enforceable as practical matter' when an SCR is used to control NOx emissions. This position is substantiated further in the above discussion.

The operational parameters (such as catalyst temperature, ammonia/urea feed rate, airflow rate) for a SCR system are not adequate surrogates for the NOx emission rate, to show compliance with the permit limit and therefore are not 'enforceable as practical matter'. This is because the parameters do not reflect the performance of the SCR to control NOx emissions either on a solo basis or in combinations. The operational parameter may be necessary to achieve compliance, but cannot be used to demonstrate compliance on a continuous basis. The only measure, which can be reasonably ascribed to the performance of the SCR, is the outlet NOx concentration or emission rates which shows whether the permit limit is being complied with or not.

The Beta Steel Corporation's (Beta) proposal to use a process control monitor (Chemiluminescent NOx analyzer Model AIT 203), as an alternative to the CEMs at this facility is unacceptable to IDEM, OAQ also. The process control system measures NOx emission rate at the outlet of the SCR system and then feeds it back to control ammonia/urea flow in the inlet. This process control monitoring system is similar in nature to the monitoring systems required per the CEMs. CEMs are subject to rigorous quality assurance and quality control requirements (including but not limited to annual Relative Accuracy Test Audits, Cylinder Gas audits etc.) for the purposes of calibration and certification. This ensures that the performance of the monitor is within the specifications and the data generated by its operation are reasonably reliable and accurate. The process control monitor does not meet the quality assurance / quality control standards and is not certified and calibrated per IDEM, OAQ guidance. If it does meet all the QA/QC requirements where the data provided by this monitor can reasonably ascertain compliance then it would automatically qualify as CEMs. Therefore the commentator's presumption that this monitor meets the monitoring objective of 326 IAC 3-5-1 (d) by providing reasonable demonstrations of compliance is inaccurate. The requirement to install CEMs provides reasonable assurance that the NOx emissions data is reliable and acceptable to show the compliance status of the emissions unit with the emissions limit in the permit. The process monitor will not be accepted as a substitute for CEMs for this permit, because the NOx emission rate data collected by this monitor is not reliable and does not assure compliance with the permit limit.

Therefore, the IDEM, OAQ has set a short-term emission limit for NOx emissions from the reheat furnace, and required the installation of a NOx CEMs to show compliance. The IDEM, OAQ believes that these requirements are reasonable and common practice among sources using similar control devices.

[1] See, EAB decision for Steel Dynamics, Inc. "In re Steel Dynamics, Inc. PSD Appeal No. 99-04 and 99-05 (EAB, June 22, 2000)".

Therefore, IDEM, OAQ rejects the commentator's argument that the requirement for CEMs be removed and replaced with parametric monitoring requirements. No changes are required to any permit conditions.

IDEM, OAQ has regularly interacted with Beta Steel and occasionally with the commentator to discuss the various permit changes being proposed in this amendment. During these discussions Beta was informed that for the NOx limit on the reheat furnace to be 'enforceable as practical matter', IDEM, OAQ consistent with EPA guidance on the issue, plans to require the installation of CEMs. This public comment and response to comment provides the opportunity to Beta and the commentator to address this issue as part of the public record and preserve the issue for review. It is incorrect to state that Beta or the commentator will be deprived of due process rights by this procedure. This approval will be subject to the appeal process in accordance with 326 IC 4-21.5-3-7 (Review; Petition; Denial of Petition; Prelimnary Hearing) and IC 13-15-6 (Appeal of Agency Determination to Issue or Deny Permit). This provides an opportunity to Beta and/or the commentator to raise any issues that were preserved as part of the administrative record. The detailed appeal procedures are provided as part of cover letter with subject 'Notice of Decision' with this approval.

On March 3, 2003, U.S.EPA published a notice for "Conditional Approval of Implementation Plan: Indiana" in the Federal Register / Vol. 68, No.41 at pages 9892 through 9895. This notice grants conditional approval to the PSD State Implementation Plan (SIP) under provisions of 40 CFR §51.166 and 40 CFR §52.770 while superceding the delegated PSD SIP authority under 40 CFR §52.793. The effective date for these provisions is April 2, 2003. Therefore the item 2 and 3 on page 5 of the draft approval letter for significant amendment 127-9642 is revised as follows (where language deleted is shown with strikeout and that added is shown in bold):

2. ~~Pursuant to 40 CFR 124.15, 40 CFR 124.19, and 40 CFR 124.20, this permit becomes effective upon its issuance, if no comments are received during the comment period for this permit.~~

   ~~-or-~~

   ~~Pursuant to 40 CFR 124.15, 40 CFR 124.19, and 40 CFR 124.20, the effective date of this permit will be thirty (30) days after the service of notice of the decision, if comments are received during the public comment period for this permit. Three (3) days shall be added to the thirty (30) day period if service of notice is by mail.~~

   Pursuant to IC 13-15-5-3, this permit becomes effective upon its issuance. Pursuant to 326 IAC 2-2 (Prevention of Significant Deterioration), 326 IAC 2-1.1-6 (Public Notice), IC 4-21.5-3-7 (Review; Petition; Denial of Petition; Preliminary Hearing) and IC 13-15-6 (Appeal of Agency Determination to Issue or Deny Permit) this approval can be appealed as specified in these provisions.

3. Pursuant to ~~40 CFR 52.21(r)(2)~~ ~~and~~ 326 IAC 2-2-8(a)(1) (PSD Requirements: Source Obligation) this permit to construct shall expire if construction is not commenced within eighteen (18) months after receipt of this approval or if construction is discontinued for a continuous period of eighteen (18) months or more, or if construction is not completed within reasonable time. IDEM may extend the eighteen (18) month period upon satisfactory showing that an extension is justified.

Comment 2:

IDEM proposes to add a requirement that "pursuant to 326 IAC 2-2-3(a)(3)" Beta shall comply with the following throughput limitations and maintain records for sixty (60) months:

a) The maximum short-term metal production capacity from the meltshop shall not exceed 151 tons per hour; and

b) The maximum long-term metal production capacity from the meltshop shall not exceed 1,100,000 tons per year.

The only other rationale IDEM provided is that throughput limitations will demonstrate compliance with the revised Permit limitations (Permit Amendment Letter, p. 5 of 6). IDEM has not explained how or why

these particular throughput limitations will demonstrate compliance with the revised Permit limitations.

Beta points out that the Permit is replete with compliance demonstrations, such as stack test requirements, recordkeeping, and proposed parametric monitoring. Throughput limitations do not add any additional meaningful information that demonstrates that Permit limitations are being met. Rather, all the throughput limitations do is make it even more difficult for Beta to operate a successful business. Beta should be allowed to increase its throughput without a prolonged IDEM Permit amendment process. Requiring such a process restrains business for no recognized environmental benefit.

326 IAC 2-2-3 does not grant IDEM authority to impose throughput limitations. That regulation provides:

> Any owner or operator of a major stationary source or major modification shall comply with following requirements:
> (i) A major stationary source or major modification shall meet each applicable emissions limitation under the state implementation plan and each applicable emissions standard and standard of performance under 40 CFR Part 60 and 40 CFR Part 61.
> (ii) A new, major stationary source shall apply best available control technology for each pollutant subject to regulation under the provisions of the CAA for which the source has the potential to emit in significant amounts as defined in section 1 of this rule.
> (iii) A major modification shall apply best available control technology for each pollutant subject to regulation under the provisions of the CAA for which the modification would result in a significant net emissions increase at the source. This requirement applies to each proposed emissions unit at which a net emissions increase of the pollutant would occur as a result of a physical change or change in the method of operation in the unit.
> (iv) For phased construction projects, the determination of best available control technology shall be reviewed and modified as appropriate at the latest reasonable time, which occurs no later than eighteen (18) months prior to commencement of construction of each independent phase of the project. At such time, the owner or operator of the applicable source may be required to demonstrate the adequacy of any previous determination of best available control technology for that source.

Nowhere are throughput limitations required or authorized.

Thus, as with all Permit terms and conditions, IDEM may impose throughput limitations only if they are rational, supported by the facts, consistent with law and IDEM's authority, not unduly burdensome, and neither arbitrary nor capricious. IDEM has provided no factual or legal basis for this burdensome requirement; as such it should be deleted from the Permit amendment.

Beta further points out that the assumption that the maximum capacity of the meltshop is 151 tons per hours of molten steel (on which both throughput limitations are based) is an estimate and somewhat speculative, at best. It is irrational, an abuse of IDEM's discretion, contrary to law, arbitrary and capricious, and unduly burdensome for IDEM to limit Beta's production based upon estimates. A possible alternative might be a requirement that Beta notify IDEM when it exceeds certain throughput capacities. In the event IDEM provides some supposed factual or legal basis for this requirement when it issues the final Permit amendment, Beta will have had no opportunity to raise related issues and thus will have been deprived of its due process rights.

Response 2:

On April 02, 2001 Beta Steel submitted a 'Request for revision to PSD Construction Permit; CP 127 2326 A 127 ….' to IDEM, OAQ to revise emissions limitations for the Meltshop Baghouse Stack and Hot Strip Mill Stack as a continuation of an earlier request. The earlier request was submitted on December 15, 1998 by Beta Steel for the revisions of the emissions limitations for the Meltshop Baghouse Stack. In the cover letter to the 2001 submission, in the footnote 3, Beta stated that "pages 41-47 of the 1998 request for emission limit adjustment provide an in-depth discussion on the rationale for an adjustment for VOC limits." Nowhere in this letter did Beta supercede, override or negate any assertions made in the 1998

submittal for the VOC analysis. Instead, Beta resubmitted the entire 1998 submission in 2001, with a cover letter referring to the discussions in the 1998 submission and various stages of interactions with IDEM staff to revise the permit to reflect a case-by-case analysis because of an enclosed Meltshop.

1. Short term production limit

The section 4.5 of the 1998 and 2001 submissions describe in detail the proposed emission limits for VOCs from the Meltshop. In section 4.5.1 on page 100, Beta Steel specifies a short term production rate of 151 tapped tons per hour. The IDEM, OAQ relied on this information to evaluate the BACT analysis for the Meltshop. In addition, the short term tons per hour production limit is essential, to ensure that the hourly emission rate limitations are 'enforceable as practical matter', for NOx, CO, SO2 and VOC emissions for which no monitoring systems have been installed by Beta on the Meltshop.

As part of further evaluations and discussions, IDEM, OAQ has concluded that the 151 tons per hour production limit can be overly restrictive and difficult to comply with because no averaging is allowed in the draft permit. In the absence of an averaging time, the production limit will have to be met for each heat, which usually lasts slightly longer than an hour. Therefore, IDEM, OAQ proposes to add a 24 operating hour rolling average with compliance determined at the end of each hour as stated in section 2.1.6 on page 15 of the 1998 submission. This will allow the Permittee the flexibility to account for variability of charges in each heat while showing compliance with the applicable limitations and ensure the practical enforceability. The following changes are made to the item 1 in the amendment letter to condition 23 added to the permit:

23. That pursuant to 326 IAC 2-2-3(a)(3), the Permittee shall comply with the following throughput limitations:

    a. The maximum short-term metal production capacity from the meltshop shall not exceed 151 tons per hour**, over a period of 24 operating hours rolling average, with compliance demonstrated at the end of each hour**; and

    b. The maximum long-term metal production capacity from the meltshop shall not exceed 1,100,000 tons per year.

    Records shall be maintained for a minimum of 60 months and submitted upon request.

2. Annual production limit

Throughout the 1998 and 2001 submissions, Beta uses the term "liquid steel 'production cap' specified in the construction permit of 1,100,000 tapped tons per year" for e.g. see pages 24, 25, 28 etc. In particular on page 98, 99 and 100 of this submission, Beta shows the annual emissions calculations which use the 1.1 million tons per year of steel production to calculate annual emissions limits as part of the BACT determination using the pounds of emissions per ton of steel produced.

In various communications and information submissions, Beta has never argued against or negated this production limit, and has never complained about this being considered as a basis for calculating emissions limitations as part of the BACT. Therefore, IDEM, OAQ considers this 1,100,000 million tons of molten steel per year production limit, as an operational characteristic, for the meltshop for the evaluation of the BACT limitations. Hence for the practical enforceability of the BACT limitations, it is important to restrict the annual steel production, and require Beta to keep records so there can be reasonable assurance of compliance with the permit limitations.

No changes are made to any permit conditions.

IDEM, OAQ has regularly interacted with Beta Steel and occasionally with the commentator to

discuss the various permit changes being proposed in this amendment. During these discussions Beta was informed that for the NOx limit on the reheat furnace to be 'enforceable as practical matter', IDEM, OAQ consistent with EPA guidance on the issue, plan to include production limitations. This public comment and response to comment provides the opportunity to Beta and the commentator to address this issue as part of the public record. This approval will be subject to the appeal process in accordance with 326 IC 4-21.5-3-7 (Review; Petition; Denial of Petition; Prelimnary Hearing) and IC 13-15-7-1 (Objections; request for adjudicator hearing). This provides an opportunity to Beta and/or the commentator to raise any issues that were preserved as part of the administrative record. The detailed appeal procedures are provided as part of cover letter with subject 'Notice of Decision' with this approval.

Comment 3:

The Permit amendment imposes sulfur dioxide ("SO_2") emissions limitations on the meltshop baghouse stack of 0.33 pounds per ton of steel produced and 49.87 pounds per hour (218.4 tons per year). Beta objects to these limitations for the reasons that they are contrary to law, an abuse of IDEM's discretion, irrational, arbitrary and capricious, unduly burdensome, and not supported by the facts, for the following reasons:

IDEM properly concluded under its best available control technology ("BACT") analysis contained in its TSD (TSD, pages 9-14 of 30) that all control technology is technically infeasible for controlling SO_2 emissions from a meltshop. IDEM acknowledged that there is a wide range of SO_2 emissions limits for meltshops (TSD, page 13 of 30). IDEM noted that the lowest SO_2 BACT emissions limitation with which a steel meltshop is in compliance is 0.15 lb SO_2/ton (Nucor – Yamato Steel in South Carolina) and that compliance by that facility was demonstrated only because "they utilize a petroleum coke product with a sulfuric content of less than 2 percent" (TSD, page 14 of 30). IDEM further acknowledged that SO_2 emissions "are based on the amount of sulfur in the raw materials (i.e., steel scrap, DRI, charge and injection carbon), the amount of sulfur removed through the slagging process, and the amount of sulfur left in the steel product" (TSD, page 14 of 30). Finally, IDEM stated that it arrived at Beta's SO_2 limitation on the basis of a "material balance … performed by Beta Steel to estimate the uncontrolled SO_2 emission rate from the EAF [electric arc furnace]" (TSD, page 14 of 30).

> BACT means:
> [A]n emission limitation . . . based on the maximum degree of reduction for each pollutant subject to regulation under [the] Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques . . . for control of such pollutant.

In re: Steel Dynamics, Inc., 9 E.A.D. 165,171-72 (EAB 2000) (quoting 40 C.F.R. § 52.21(b)(12)) (emphasis added).

BACT is a site-specific determination, resulting in "the selection of an emission limitation and a control technology that are specific to a particular facility." In re: Three Mountain Power, LLC, PSD Appeal No. 01-08, slip op. at 13 (EAB, May 30, 2001) (emphasis added); 40 C.F.R. § 52.12(b)(12) ("best available control technology means an emission limitation which the Administrator, on a case-by-case basis . . . determines is achievable for such source") (emphasis added). BACT limitations should be practicably and continuously achievable by the source. In re: Steel Dynamics, Inc., 9 E.A.D. at 188; In re: Masonite Corp., 5 E.A.D. 551, 560-61 (EAB 1994). "There is nothing inherently wrong with setting an emission limitation that takes into account a reasonable safety factor." In re: Knauf Fiber Glass, GmbH, 9 E.A.D. 1, 15 (25% safety factor employed and upheld; "The inclusion of a reasonable safety factor in the emission limitation calculation is a legitimate method of deriving a specific emission limitation that may not be exceeded"); In re: Three Mountain Power, LLC, supra, slip op. at 21.

The SO_2 limitations IDEM is imposing on Beta's meltshop are not practicably and continuously achievable by Beta, so that they are not BACT here and should be modified to include a reasonable safety factor. The SO_2 study Beta submitted to IDEM was authored in 1998 and is based upon data from approximately the three (3) prior years of operation. It appears that IDEM set Beta's SO_2 limitations strictly on the basis of that data and that IDEM did not take into account either a reasonable safety factor to account for such things as variability in raw materials or more recent stack test data.

IDEM is well-aware that since 1999 Beta has conducted three (3) stack tests which have demonstrated Beta's SO_2 emissions to be 41.37 pounds/hour (2000), 54.59 pounds/hour (2001), and 89.89 pounds/hour (2002). (Beta hereby incorporates as if fully set forth herein its 2000, 2001, and 2002 stack test results which have been submitted to IDEM's Compliance Data Section and has attached hereto as Attachment C a summary of those SO_2 stack test results.) Based on this more recent data, Beta cannot practicably and continuously achieve the SO_2 limitations IDEM is setting; as such, the proposed SO_2 emissions limits are not BACT for Beta's meltshop. It is not rational, is not supported by the facts, is arbitrary and capricious, and is contrary to law to set SO_2 emissions limitations for Beta's meltshop by ignoring evidence that the data on which the limitations are based may not be representative of Beta's SO_2 emissions and when the limitations do not include a safety factor to account for variability in raw materials. As IDEM stated elsewhere, it is inappropriate and unrealistic to set up a source for non-compliance by imposing limitations that it is not able to practicably and continuously achieve. Steel Dynamics, 9 E.A.D. at 187.

Response 3:

The IDEM, OAQ disagrees with the objection raised by the commentator for the SO2 emissions limit for the Meltshop baghouse stack. IDEM, OAQ would highlight a different part of the definition of BACT under 326 IAC 2-2-1(h) as "[A]n **emissions limitation** (including a visible emissions standard) based on the **maximum degree of reduction** for each pollutant subject to regulation under the provisions of the CAA, which would be emitted from any proposed major stationary source or major modification, which the commissioner, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines **is achievable for such source or modification through application of production processes or available methods, systems, and techniques**, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant… [emphasis added]."

The definition of BACT states that the BACT is an emission limitation (for a pollutant) and it should be based upon the maximum degree of reduction. Also of note is the elaboration that the emissions limitations be achievable through application of production processes or other methods and techniques. The TSD for the draft permit has shown in detail the emissions limitations ranges for similar sources for SO2. IDEM and Beta went through the repetitive process of checking the feasibility of each level of emission control starting with the most stringent limitation. The reasons for not adopting various more stringent limitations have already been elaborated in the TSD. The IDEM, OAQ chose the emission limitation representing BACT based on the technical feasibility and nature of the production process representing similar operation at other sources.

The IDEM, OAQ followed the well-established procedure for 'Top-down BACT analysis' to establish SO2 emission limitations. U.S.EPA, through various guidance memorandums, shaped the 'top-down' analysis approach for BACT review. In a memo[1], U.S.EPA stated ".. top-down approach explicitly recognizes the self-evident presumption that technologies already shown to be 'available' can be used by the prospective source under consideration, and the fact that the PSD applicant is in the best position to provide an initial justification why an available technology is not 'achievable' for that particular source as well. In explicitly calling upon PSD applicants to consider the most stringent controls first, and either adopt those controls or explain why they are not achievable, EPA is only seeking to improve the administration of an existing requirement. The permitting authority after public review and comment remains responsible for exercising informed judgement in determining achievability in accordance with this requirement"

[1] See, Memorandum from John Calcagni, Director, Air Quality Management Division, Office of Air Quality Planning And Standards, US EPA in "Transmittal of Background Statement on 'Top-down' Best Available Control Technology (BACT)" – June 13, 1989.

Further discussing the merits of this approach being consistent with the Clean Air Act requirements, the same memo elaborates on various appeal decisions as "…[T]he Administrator interpreted the BACT definition as requiring the PSD applicant to demonstrate to the permitting authority why the most stringent control technology 'available' is not 'achievable' in this case". Beta Steel has never presented any information, other than non-compliant stack test, for the demonstration that the SO2 BACT emissions limitations are not achievable.

In a previous memo[1], U.S.EPA stated a simplified version of the 'top-down' analysis as "The first step in this approach is to determine, for the mission source in question, the most stringent control available for a similar or identical source or source category. If it can be shown that this level of control is technically or economically infeasible for the source in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objection."

The previously discussed NSR Manual[2] describes in great detail the 'Step-by-Step Summary of the Top-down Process'. In this section for the first step of 'identification of control technologies', EPA stated that, "The first step in a 'top-down' analysis is to identify, for the emissions unit in question (the term 'emissions unit' should be read to mean emissions unit, process or activity), all 'available' control options. **Available control options are those air pollution control technologies or techniques** with a practical **potential for application** to the emissions unit and the regulated pollutant **under evaluation**. **Air pollution control technologies** and techniques include the **application of production process or available methods, systems, and techniques**, including fuel cleaning or treatment or innovative fuel combustion techniques for control of the affected pollutant. This includes technologies employed outside of the United States. As discussed later, in some circumstances **inherently lower-polluting processes are appropriate for consideration as available control alternatives**. The control alternatives should include not only existing controls for the source category in question, but also (through technology transfer) controls applied to similar source categories and gas streams, and innovative control technologies. Technologies required under lowest achievable emission rate (LAER) determinations are available for BACT purposes and must also be included as control alternatives and usually represent the top alternative [emphasis added]."

Further, for categorization of control alternatives, the NSR Manual identifies "Inherently Lower-Emitting Processes/Practices, **including the use of materials and production processes and work practices that prevent emissions and result in lower "production-specific" emissions**… Lower-polluting processes should be considered based on demonstrations made on the basis of manufacturing identical or similar products from identical or similar raw materials or fuels. " For further elaboration on this aspect of the BACT, in the same chapter it is stated that "Historically, EPA has not considered the BACT requirement as a means to redefine the design of the source when considering available control alternatives… However, this [production processes and work practices] is an aspect of the PSD permitting process in which **states have the discretion to engage in a broader analysis if they so desire**… [also] a **production process is defined** in terms of its **physical and chemical unit operations** used to **produce the desired product** from a specified set of raw materials. In such cases, the **permit agency** may **require the applicant** to include the **inherently lower-polluting process in the list of BACT candidates**."

With this background, IDEM, OAQ emphasizes that it has exhaustively reviewed similar operations and information submitted by Beta for evaluation of SO2 emission limit under BACT. The detailed analysis is available in the TSD for the draft permit. IDEM, OAQ set the SO2 emission limit comparable to similar sources where the compliance with similar emission limit was demonstrated.

In fact, Beta had shown in the past performance tests conducted in January 1998, January 1999 and

[1] See, Memorandum from J.Craig Potter, Assistant Administrator for Air and Radiation, US EPA in "Improving New Source Review (NSR) Implementation" – December 01, 1987.
[2] See Chapter B page B.5-B.55, "Enforceability of BACT" in the, "New Source Review Workshop Manual", by US EPA, Draft – October 1990.

November 2000 that the emission rates were below the proposed emissions limit for SO2 under the BACT. Therefore, the Beta's comment that "The SO2 limitations IDEM is imposing on Beta's meltshop are not practicably and continuously achievable by Beta, so that they are not BACT here and should be modified to include reasonable safely factor" is without merit. In the past Beta has actually demonstrated that the SO2 emission rates from meltshop are consistently below the limit proposed in this permit. IDEM, OAQ in consultation with Beta, used the information contained in the 1998 submission and also any additional stack test information that was available, reviewed and verified by the IDEM staff (stack test information for 1999 and 2000 tests).

The 2001 stack test described by Beta was never verified by IDEM and does not constitute an official stack test per IDEM compliance requirements. This test was conducted primarily for the study of SO2 emissions from the Slag pits at Beta and therefore, was not considered as part of the record for this modification. The most recent stack test conducted by Beta in 2002 showed a potential violation of the proposed BACT limit for SO2 emissions. This test is presently under review with the Office of Enforcement of IDEM. None of these aspects affect the determination of BACT per U.S.EPA guidance.

The last submission[1] by Beta proposes an adjustment to the SO2 emission limit to 45.31 lb/hour. At 151 tons/hour, this limit translates to 0.3 lb of SO2/ton of steel for the meltshop baghouse exhaust stack. Nowhere in this submission is there any argument about potential non-compliance with this limitation. In many subsequent submissions, email exchanges and discussions, Beta did not mention any issues related to potential non-compliance with the SO2 emission limit in the draft permit amendment. IDEM, OAQ made Beta aware about the proposed SO2 emission limit of 0.33 lb/ton in a draft permit document as early as November 28, 2001 in an email[2]. Beta has not presented any information to the Permits Branch of IDEM, OAQ explaining the stack test results and information. Rather, in a letter[3] (which Beta has already incorporated as part of the record), Beta stated that, "[They are] aware of the increase in SO2 emissions present in the last stack test results. An investigation has been started to evaluate the possible sources of this change and to take the action needed to **correct the situation** [emphasis added]." Therefore, IDEM, OAQ understand from this communication that Beta believes that this increase is a one-time situation and is correctable by investigating into the cause of this increase.

The IDEM, OAQ only became aware of Beta's assertion that the 'SO2 limitations.. are not practically and continuously achievable by Beta' through these comments. Further, Beta has provided no information that demonstrates that the SO2 emissions limitation selected is not appropriate for this process as per the requirements of a 'top-down' BACT review. Similarly, Beta has not provided any information to IDEM to justify a 'reasonable safety factor' or determine what a 'reasonable safety factor' might be. While the EAB decisions cited by Beta have upheld permitting agencies decision to incorporate 'cushions' into an emission limit, the practice is not considered mandatory. Further, Beta has not presented any information to IDEM, OAQ to suggest that it cannot comply with the proposed BACT limit on a more or less continuous basis. Finally, Beta has not provided any justification as to why process modifications should not be considered as BACT for this process.

Therefore, IDEM, OAQ disagrees with commentator's arguments about the SO2 emissions limitations on the Meltshop Baghouse stack. No changes are made to any permit conditions.

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[1] See letter from Peter Zasowski, Director of Manufacturing of Beta Steel, to Paul Dubenetzky, Chief, Permits Branch, OAQ, IDEM, "Request for revision to PSD Construction Permit CP 127 2326,…", March 28, 2001

[2] See email from Gurinder Saini of OAQ, IDEM to Joe Gazarkiewicz of Beta Steel, "Beta Steel - 9642 - Meltshop and Reheat furnace limits revision", November 28, 2001.

[3] See letter from Joe Gazarkiewicz, Manager, Environmental Services, to Paul Dubenetzky, Chief, Permits Branch, OAQ, IDEM, December 23, 2001.

Written comments were received from Charlotte Read on behalf of Save the Dunes Council on April 11, 2003. These comments and IDEM, OAQ responses are as follows:

Comment 1:

I have just reviewed the draft "significant amendment to CP:127-2326,Plant ID:127-00036" for Beta Steel Corporation.I have compared the draft General Conditions in the permit conditions stated at page one under changes in the permit conditions. Checking Save the Dunes Council files, we sent comments in response to an amendment to CP 127-00036 regarding changes proposed in 1997. Changes if any to emission limits for A 127-7055 seem unclear. Perhaps no changes were made. The March 28, 2001 letter to IDEM for revision to the PSD construction permit references the 1997 amendment.

I note from my review of the Beta Steel Corporation file that the 1997 amendment talked about 2 EAFs, 4 11.5 MMBtu/hr Ladle Preheat Station, 27 MMBtu/hr Ladle Dryout Stations (ultra-low NOX burners) and 3.5 MMSBtu/hr tundish dryout and preheat statons (low NOx burners).

Response 1:

The amendment referred to by the commentator did not change any emissions limits in the construction permit. This is the first significant amendment to the original construction permit CP 127-2326-00036 that modifies emissions limits. The equipment constructed by Beta Steel differed from as stated in the CP 127-2326-00036. These equipment description changes were shown in the amendment referred to by the commentator and have been incorporated in the permit as described in this significant amendment letter A 127-9642-00036.

Comment 2:

I also note from the January 3, 2003 "enforcement referral" for the meltshop baghouse stack that the meltshop was out of compliance with the proposed new average SO2 emissions limit of 49.9 lbs/hr. As far as proposed new NOx limits, the average NOX emissions would be raised to 68.6 lbs/hr compared with the 40.9 lbs/hr average listed in the referral letter.

It is disturbing to the Council that the total SO2 emissions from the meltshop stack will increase annually from 26 tons per year to 218.4 tons per year. Emissions of NOx from meltshop operations will increase from 97.4 tons/year to 300.5 tons/year. Similar huge increases in annual tons per year are allowed for the slab reheat furnaces.

Response 2:

The SO2 and NOx emissions limits are revised as part of the BACT determination for the Electric Arc Furnace at Beta Plant. The IDEM, OAQ has provided detailed discussions in the TSD for this significant amendment, describing the evaluation of control alternatives, and selection of the suitable emissions limits, based on this analysis. IDEM, OAQ has evaluated the emissions limits changes at Beta's emissions units, per the applicable regulations and revised the permit conditions accordingly. Also, as stated in response 3 for the Beta's comments, IDEM, OAQ is aware about the possible violation of the SO2 proposed emission limit at EAF during a recent stack test. This test is presently under review with the Office of Enforcement of IDEM. None of these aspects affect the determination of BACT per U.S.EPA guidance. Therefore, no changes are required to any permit conditions.

Comment 3:

We note that the proposed annual limit for VOC emissions is increased by 9.7 tons/year because Beta is not building a new hot strip mill. Does IDEM presume that these 9.7 tons belong to Beta steel?

Response 3:

IDEM, OAQ on page 18 of the TSD has described the analysis of annual VOC emissions limit from the meltshop at the Beta plant. As described on page 100 of the December 11, 1998 submission by Beta, the annual VOC emissions limit for the Meltshop stack in the original construction permit CP 127-2326-00036 was based on the intent to limit the VOC emissions from the entire source under 100 tons per year. The 100 tons per year VOC threshold was the "construction ban" applicable at the time for new construction in the Porter County. By reallocating the allowable VOC emissions from the second hot strip mill to the Meltshop stack, IDEM has retained the intent of the original construction permit CP 127-2326-00036 as allowed under the applicable regulations.

Comment 4:

We note that under operating conditions visible emissions from any building opening or roof building shall comply with a 3% opacity. Will a qualified person or a trained employee familiar with Method 9 procedures be doing the reading?

Response 4:

This significant amendment to the construction permit focuses on revising the emissions limitations for the meltshop and the reheat furnace. The limitations and conditions related to the opacity are unaffected in this amendment. Therefore, IDEM, OAQ has retained the opacity conditions in the permit unchanged. The IDEM, OAQ's inspection staff who regularly inspect this source are certified for Method 9 observations and use this method to evaluate the compliance of the various openings with the applicable limitations. This permit places no obligation on Beta staff to use Method 9 to demonstrate compliance. The IDEM, OAQ is presently reviewing a Part 70 Operating Permit application T 127-9691-00036 and is drafting a Part 70 Operating Permit for this source. Detailed requirements for Beta staff regarding compliance determination and monitoring will be specified in this Part 70 Operating Permit.

Comment 5:

In the Council's opinion, the increased limits proposed in this draft permit cannot be considered "not significant." Beta Steel is located on state owned property, i.e. Port of Indiana land. As OAQ knows, there are numerous sources of air pollutants. The Council has urged OAQ to consider the Port of Indiana site as an area source, since it functions as a substantial industrial park. To the east of the Port site is NIPSCO's Bailly Generating Station, and the Bethlehem Steel's [at least for now] Burns Harbor Integrated Steel Mill. To the west, but still east of Portage Burns Waterway is National Steel's [at least for now] Midwest Division plant.

Response 5:

In order to evaluate Beta's request for the revisions to emissions limits, the IDEM, OAQ modeled the effect of increase in emissions rates from the meltshop and the reheat furnace. Thereafter, in accordance with the regulations, U.S.EPA guidance and IDEM guidance[1], these modeled emissions rate were compared to the 'Significance Levels for Air Quality Impacts in Class II Areas[2]'. In the NSR Manual[3], U.S. EPA on page C.26 stated that, "The proposed project's ***impact area*** is the geographical area for which the required air quality analyses for the NAAQS and PSD increments are carried out. This area includes all

[1] See IDEM, Guidance for evaluating emissions increases at Major Sources at http://www.in.gov/idem/air/programs/modeling/policy.html as of May 5, 2003.

[2] See table C-4 on page C-28 of chapter C, 'The Air Quality Analysis' in the "New Source Review Workshop Manual, Prevention of Significant Deterioration and Non-Attainment Area Permitting", by US EPA, Draft – October 1990 and Significant Impact Level for Class II areas, as specified by U.S. EPA in the Federal Register, Volume 43, No. 118, pg 26398, Monday, June 19, 1978.

[3] See chapter C, 'The Air Quality Analysis' in the "New Source Review Workshop Manual, Prevention of Significant Deterioration and Non-Attainment Area Permitting", by US EPA, Draft – October 1990.

locations where the significant increase in the potential emissions of a pollutant from a new source, or significant net emissions increase from a modification, will cause a **significant ambient impact (i.e., equal or exceed the applicable significant ambient impact level, as shown in *Table C-4)*** [emphasis added]. The highest modeled pollutant concentration for each averaging time is used to determine whether the source will have a significant ambient impact for that pollutant." The comparison of the modeled emissions rates with the Significance levels is shown in the Air Quality Analysis section of the TSD for this permit. As stated in this section, the modeled impacts from the modification are below the significance levels for the NO2, SO2 and PM10. Therefore, no further refined modeling was necessary for this change. Hence, consideration of Port of Indiana as a single source would not effect the outcome of this modeling analysis as the modeled emissions rates were below significance levels.

The following is a list[1] of tenets at Port of Indiana in the Porter County.

ADS Logistics, LLC - Roll & Hold	Beta Steel Corporation
Burns International Security	Calumite Co.
Cargill, Inc.	Central Coil Processing, LLC
Chicago Cold Rolling LLC	Federal Marine Terminals, Inc.
Fedmar International	Feralloy Processing Corp.
Feralloy Midwest Corp.	Flat Rock Metal Processing LLC
Frick Services - Dry	Frick Services-Liquid
Global Stone Corp.	Great Lakes Processing LLC
Great Lakes Towing Co.	ILA Local 1969
Indiana International Seafarer Center Inc.	Indiana Pickling & Processing
Lakes and Rivers Transfer	Levy Company
Mid-Continent Coal & Coke Co.	SKF Steel
Steel Warehouse Co., Inc.	Tanco Terminals, Inc.
Walsh & Kelly	

The IDEM, OAQ has confirmed that all the air emission sources in the above list have applicable permits and are included in the emissions inventory for State air quality planning activities.

No changes are required to any permit conditions.

Comment 6:

We find the proposed limits to be excessive and ask that OAQ take another look before finalizing this permit. We also urge that the scrap management plan that is a part of Beta's permit obligation be changed to high gradescrap similar to the plant referenced [p.16 footnote] for Nucor Steel in Arkansas which would reduce sulfur, and perhaps reduce the VOC emissions from Beta's EAF due to oils and paints present in the scrap used [p.15].

Response 6:

The Beta Steel has implemented a scrap management plan to minimize VOC emissions from the meltshop. As explained on page 16 of the TSD, the Nucor Steel in Arkansas manufactures flat rolled steel products, which are different from the structural steel products at Beta that include girders, bars and beams. Therefore, Beta Steel consistent with other manufacturers of similar products, to meet grade specifications and to stay competitive, utilizes a lower grade scrap at the meltshop. As shown in the top down BACT analysis, this is consistent with the manufacturing practices at other similar sources manufacturing similar products in the country. Therefore no changes are required to any permit conditions.

[1] See the web-site "Port of Indiana" at http://www.portsofindiana.com/?pageRef=160 as of May 5, 2003.

Comment 7:

We support the requirement for a Continuous Emissions Monitor for Nox to be installed at the reheat furnace stack.

Response 7:

The CEM system will ensure consistent compliance with the applicable NOx limitation for the reheat furnace and is essential for optimum operation of the SCR system as explained earlier.

Changes to the draft permit amendment identified by IDEM, OAQ

There is only one electric arc furnace at Beta Steel plant, the reference to 'furnaces' in condition 1. of the permit amendment letter is changed to 'furnace' as follows:

1. That pursuant to 326 IAC 2-2-3(2), Best Available control Technology (BACT), the EAF shall be controlled by 140,000 acfm direct shell evacuation (DSE) system. The combustion elbow at the DSE shall be designed to provide 200% excess air for the oxidation of CO and other present gaseous pollutants. The~~se~~ furnace~~s~~ shall also be operated within the enclosed meltshop building under the canopy hood. The DSE and canopy hoods shall be ducted to the meltshop baghouse rated at 1.0 million actual cubic feet per minute (MM acfm), demonstrating 100% capture. Pursuant to 326 IAC 2-2 and 6-5, a fugitive dust control and baghouse operation and maintenance program (Attachment A) shall be used to insure optimum compliance with the limitations contained herein. The operation of the~~se~~ furnace~~s~~ shall each be further limited as follows:

Similar change is also required for the sub-condition f. of condition 1. In the permit amendment letter as follows:

f. That the above conditions shall satisfy New Source Performance Standards (NSPS), 40 CFR 60, Subpart AAa. Pursuant to that rule, PM/PM10 emissions shall be limited to 0.0052 gr/dscf and 3% opacity at the common baghouse control device, 6% opacity for the meltshop due solely to the operations of ~~any affected~~ **the** electric furnace, and 10% opacity from the dust handling system based on a six-minute average (24 readings taken in accordance with 40 CFR Part 60, Appendix A, Method 9).

Indiana Department of Environmental Management
Office of Air Quality

Technical Support Document (TSD) for a Significant Amendment (Modification) to a Prevention of Significant Deterioration Permit

Source Description and Amendment Request

Source Name:	Beta Steel Corporation
Source Location:	6500 South Boundary Road, Portage, Indiana 46368
County:	Porter
Construction Permit:	127-2326-00036
Amendment No.:	A-127-9642-00036
SIC Code:	3312
Permit Reviewer:	Gurinder Saini

The Office of Air Quality (OAQ) received a request for a permit amendment from Beta Steel Corporation on April 2, 1998. Supporting information was provided to the OAQ on December 15, 1998, March 22, 1999 and April 2, 2001. This request was for the revision of the meltshop NOx, SO2 and VOC emissions limits stated in Operation Condition No. 1 of Construction Permit CP-127-2326, issued on February 24, 1992. The Permittee also requested for adjustment of PM-10 and NOx emissions limit for Slab Reheat furnace being controlled by a Selective Catalytic Reduction (SCR) unit. In addition the Permittee is requesting changes to compliance determination method condition in the permit.

On December 26, 2002, the IDEM, OAQ received a request to change the responsible official for Beta Steel Corporation from Toli Folikas to Ken Burns, who is a Director at Beta Steel Corporation. This change is acknowledged in this TSD.

MELTSHOP

The meltshop at Beta Steel consists of one electric arc furnace equipped with a direct shell evacuation (DSE) system, ladle metallurgy facilities, continuous caster, and natural gas combustion units. The aggregated emissions from these facilities exhaust to the meltshop baghouse stack.

This request was initiated by Beta Steel as a result of three sets of non-compliant stack tests for NOx, SO2 and VOC at the meltshop. These tests were conducted on January 19-27, 1998, January 31 through February 2, 1999 and the latest stack test was carried out in November 2000. The results of these tests are shown below:

1/19-1/27, 1998 Test Results lb/ton steel produced			Meltshop existing emission limits lb/ton steel produced			
NOx	SO2	VOC	NOx	SO2	VOC	Comment
0.26	0.094	0.119	0.15	0.047	0.13	Out of compliance for NOx and SO2; Sampling conducted at 67.8% maximum production rate
1/31-2/2, 1999 Test Results lb/ton steel produced			Meltshop existing emission limits lb/ton steel produced			
NOx	SO2	VOC	NOx	SO2	VOC	
0.17	0.18	0.40	0.15	0.047	0.13	Out of compliance for NOx, SO2, VOC
11/13-11/14, 2000 Test Results lb/ton steel produced			Meltshop existing emission limits lb/ton steel produced			
NOx	SO2	VOC	NOx	SO2	VOC	
0.41	0.33	0.24	0.15	0.047	0.13	Out of compliance for NOx, SO2, VOC

Beta Steel is requesting that the NOx and SO2 limits be revised to be consistent with subsequent BACT determinations for similar meltshop operations. The OAQ conducted the following investigation to determine the appropriate limits for the meltshop. This investigation includes a review of state and federal emission limits, stack test results, and updated emission factor information.

Beta Steel is requesting that the VOC limit be relaxed because in addition to the EAF there are other sources of VOC emissions. Therefore the meltshop emission limit should account for emissions from these sources as well.

Meltshop Process Evaluation

The Beta Steel meltshop contains equipment used to produce and refine liquid steel and to cast liquid steel into solid steel slabs. The steel slabs produced in the meltshop are transferred to the hot strip mill where they are reheated and hot-rolled into steel bands (coiled steel strip) for shipment to off-site customers.

The process equipment in the meltshop includes electric arc furnaces (EAF), ladle metallurgy furnaces (LMF), and thick-slab continuous caster (caster). The meltshop also contains natural gas-fired heating units that are used to preheat the refractory-lined ladles and tundishes that receive liquid steel and to thoroughly dry refractory materials that are applied to the inside surfaces of these vessels after repair and maintenance of the refractory surfaces. Other natural gas combustion units in the meltshop include CoJet oxy-fuel burner system and an oxy-fuel cut-off torch at the exit end of the caster. Slag produced during the refining of liquid steel is air cooled and handled within a dedicated room in the meltshop building.

A direct shell evacuation (DSE) system and a canopy hood capture the emissions generated at the EAF. The emissions generated at the LMF are captured by a side-draft roof/hood located at the LMF and by canopy hoods located above the EAF and the ladle-to-tundish steel transfer area at the caster. Emissions from the cooling and handling operations performed at the slag cooling bay inside the meltshop building are withdrawn from the room through openings in the roof to a plenum. The emissions captured by the DSE system, plenum, and various canopy hoods, as well as fugitive emissions collected in the enclosed meltshop building are exhausted to a reverse air baghouse system to collect and control particulate matter emissions generated from the process equipment.

(A) Nitrogen Oxide Emissions from the Meltshop

(1) Original and Updated Meltshop Emission Calculations

The meltshop consists of electric arc furnaces equipped with a direct shell evacuation (DSE) systems, ladle metallurgy furnaces, continuous casters, and natural gas combustion units. The following emission calculations for the meltshop were determined for Construction Permit CP-127-2326 issued on February 24, 1992:

Original Meltshop NOx Emissions limits:

Facility	Maximum Capacity	NOx Emission Factor	Source	Potential NOx Emissions		
				lbs/hr	tons/yr	lb/ton
EAF No. 1	62.8 tons/hr	0.1 lb/ton	AIRs, 9/89	6.28	27.5	
EAF No. 2	62.8 tons/hr	0.1 lb/ton	AIRs, 9/89	6.28	27.5	0.1
LMF No. 1	62.8 tons/hr	No Data	No Data	---	---	---
LMF No. 2	62.8 tons/hr	No Data	No Data	---	---	---
Caster No. 1	62.8 tons/hr	0.05 lb/ton	AP-42, 1989	3.14	13.8	
Caster No. 2	62.8 tons/hr	0.05 lb/ton	AP-42, 1989	3.14	13.8	0.05
NG Comb [1]	34 MMBtu/hr	100 lb/MMCF	AP-42, 1989	3.34	14.6	0.03
Totals:				22.2	97.1	**0.18**

[1] Natural Gas Combustion Units consist of two (2) 10 MMBtu/hr natural gas-fired ladle preheat stations, two (2) 5 MMBtu/hr natural gas-fired ladle dryout stations, and two (2) 2 MMBtu/hr tundish dryout and preheat stations.

The Source constructed only one EAF, one LMF and one Caster. At the maximum capacity, the Permittee can process 132 tons of steel per heat. A heat can last less than an hour. Therefore, the Meltshop has maximum capacity of 151 tons per hour of molten steel. The revised emission calculations are based on updated emission factor information relating to meltshop emissions. The original emission calculations were based on limited information available at the time. This updated information is more representative of the actual emissions emitted from similar meltshop operations:

Updated Meltshop NOx Emissions limits:

Facility	Maximum Capacity	NOx Emission Factor	Source	Potential NOx Emissions		
				lbs/hr	tons/yr	lb/ton
EAF	151 tons/hr	0.35 lb/ton	Stack Tests and RBLC[1]	52.85	231.48	0.35
LMF	151 tons/hr	0.04 lb/ton	Stack Tests [2]	6.04	26.5	0.04
Caster	151 tons/hr	0.05 lb/ton	AIRs, 8/95	7.55	33.1	0.05
NG Comb [3]	44 MMBtu/hr	50 lb/MMCF	AP-42, 7/98	2.15	9.4	0.01
Totals:				68.58	300.48	**0.45**

[1] The NOx emission factor for EAF was determined based on available information about existing limits on similar EAFs (Steel Dynamics – IN 0.35 lb/ton and Tuscaloosa Steel - AL 0.35 lb/ton) as part of the BACT determinations. Based on submissions from the Permittee, the meltshop baghouse NOx emissions will be able to comply with the cumulative limit mentioned in the above table.

[2] The NOx emission factor for LMF was determined by calculating the average emissions from available stack tests for LMFs (Roanoke Electric Steel ,VA - 0.06 lb/ton and Trico, AL - 0.02 lb/ton).

[3] Natural Gas Combustion Units consist of three (3) 11.5 MMBtu/hr natural gas-fired ladle preheat/holding stations with low NOx burners, one (1) 6 MMBtu/hr natural gas-fired ladle preheat/holding stations with low-Nox burners, one (1)) 3.5 MMBtu/hr tundish dryout and preheat stations, one (1) CoJet oxyfuel burner system, and one (1) oxy-fuel cutoff torch at the exit end of the caster.

(2) BACT Analysis

The project was a major modification that required an analysis of the best available control technology (BACT) pursuant to 326 IAC 2-2. As this request for revision of emission limits is not a physical or operational change to the project, the OAQ used the rules that applied when the project was originally permitted. Therefore, a reevaluation of the BACT analysis was performed.

NOx Formation:

The majority of NOx emissions from the meltshop are caused by the oxidation of nitrogen in air exposed to the high temperature electric arc (thermal NOx formation) that is used to provide heat to the EAF. In the EAF, air is drawn into the furnace by the DSE fume collection system and oxygen is injected through lances to accelerate melting of scrap and affect oxidation reactions in the liquid steel solution during refining. During the melting phase, the air in the furnace is directly exposed to the high temperature electric arc. This forms free radicals of Nitrogen which combine with the oxygen in the furnace to form NOx. Near the end of the melting phase and the beginning of the refining phase, carbon and oxygen are injected into the furnace to form Afoamy slag@. When a sufficiently thick foamy slag blanket is formed on the surface of the liquid steel solution, the electric arc becomes submerged in the slag blanket. At this time, the nitrogen in the furnace is not exposed to the electric arc and NOx formation is suppressed. This reduces NOx emissions to low levels. The time required to form the foamy slag blanket and submerge the arc is believed to affect the amount of NOx generated and emitted during a heat.

In the LMF, there is air in the freeboard space above the liquid steel in the ladle. Thermal NOx is formed in the LMF by the same mechanisms that form NOx as in the EAF. The electrical power applied to the electrodes at the LMF is considerably lower than the power applied to the EAF and the arc geometry is different (i.e., shorter arc). In addition, the arc at the LMF is almost always submerged.

Emissions of NOx from the **ladle to tundish teeming operation** at the Caster are believed to be negligible with respect to emissions from the EAF and LMF. Although the liquid steel is at a temperature that may be conducive to thermal NOx formation, contact of the liquid steel stream with nitrogen and oxygen in the air is minimal. The liquid steel is teemed from the ladle to the tundish through a refractory shroud. This is done to prevent the entrainment of air (oxygen and nitrogen) into the steel (i.e., preclude contact of the high temperature steel with air). Use of this refractory shroud effectively suppresses the formation of thermal NOx during teeming.

The other sources of NOx emissions in the meltshop are the **combustion of natural gas**. The Nos. 1, 2, and 3 ladle preheat/holding stations are equipped with low-NOx fuel-air burners, the No. 4 ladle preheat/holding station is equipped with low-NOx fuel-air burners, and the tundish dryout/preheater station is equipped with a conventional fuel-air burner. The EAF is equipped with a one Co-Jet system, which includes oxy-fuel fired burners to reduce the time between the charging of the scrap and the formation of the foamy slag blanket.
Control Technology Feasibility Study for the EAF and LMF:

The following technologies for control of NOx emissions from the EAF and LMF were evaluated:

(a) Combustion Controls Techniques
- Low Excess Air (LEA)
- Overfire Air (OFA)
- Burners Out-of-Service (BOOS)
- Reduced Combustion Air Temperature (RCAT)
- Flue Gas Recirculation (FGR)
- Low NOx/Oxy-Fuel Burners

(b) Selective Catalytic Reduction (SCR)

(c) Selective Non-Catalytic Reduction (SNCR) Options

(d) Non-Selective Catalytic Reduction (NSCR)

(e) Operational Changes

There are several **combustion control technologies** available for reducing NOx emissions from combustion units including low excess air (LEA), overfire air (OFA), burners out-of-service (BOOS), reduced combustion air temperature (RCAT), flue gas recirculation (FGR), and low-NOx/oxy-fuel burners.

LEA and OFA generally creates more CO emissions due to low primary air resulting from incomplete combustion. Such conditions can result in inefficient scrap melting and unacceptable increases in tap-to-tap time. NOx reduction using these technologies are also very minimal (i.e., 10-20 percent). BOOS, reduced combustion air temperature, and load reduction all result in inefficient scrap melting and unacceptable increase in tap-to-tap time. FGR alters the distribution heat, resulting in cold spots and lowers the efficiency of the EAF. These combustion control technologies **(LEA, OFA, BOOS, reduced combustion air temperature, and load reduction**) are considered technically infeasible.

Low-NOx/oxy-fuel burners are current technically feasible control practices for the EAF. Beta Steel currently utilizes the CoJet system to provide localized rapid melting of scrap in the vicinity of the EAF openings through which oxygen and carbon lances are inserted. The CoJet system also can be used to burn depositions of solidified steel and slag from the tap hole area of the EAF and to accelerate the general melting of scrap. It is believed that the time from scrap charging, through scrap melting, to submergence of the electric arc in the foamy slag blanket affects the overall NOx emissions per heat in the EAF. The effect of the CoJet system at the EAF reduces the time to arc submergence, and therefore NOx emissions.

Selective catalytic reduction (SCR) is an Aend-of-pipe@ control approach for NOx reduction, which relies on the chemical reaction of ammonia with NOx to reduce NOx by forming water and molecular nitrogen. To achieve this reaction, the ammonia (usually diluted using air or steam) is injected through a spray grid system upstream of a catalyst bed. The function of this catalyst bed is to lower the activation energy of two NOx decomposition reactions.

In order for an SCR system to effectively reduce NOx emissions, the exhaust gas stream should have relatively stable gas flow rates, NOx concentrations, and temperature. The temperature of the EAF exhaust gas will vary widely over the melt cycle, gas flow rates and NOx concentrations and will exhibit wide variation. Moreover, the high concentration of particulate in the exhaust gas prior to the EAF particulate control device may result in fouling of the catalyst, making it ineffective. Conversely, an SCR system cannot be installed after the particulate control device due to unacceptable low temperatures. Therefore, this technology is considered technically infeasible.

The **non-selective catalytic reduction (NSCR)** system is a post combustion add-on exhaust gas treatment system, similar to the catalytic converters used on automobiles. It utilizes a three-way conversion catalyst, which reduces NOx and oxidizes unburned hydrocarbons and CO simultaneously. For this system to be effective, the combustion process must be near-stoichiometric to reduce NOx by CO, which results in nitrogen and CO2. These systems are highly susceptible to catalyst poisoning by inorganic and metallic elements (phosphorus, zinc, lead, chromium, etc.), and therefore is considered technically infeasible.

Two **selective non-catalytic reduction systems** are commercially available including *Exxon Thermal DeNOx system* and *Nalco Fuel Tech=s NOxOUT system*. In order for these systems to effectively reduce NOx emissions, the exhaust gas stream should have relatively stable gas flow rates, ensuring the requisite residence time and temperature requirements. The temperature of the EAF exhaust gas will vary widely over the melt cycle, and will not remain in the desired temperature window during all phases of the EAF operation. Similarly, the gas flow rates will not remain stable during the EAF operation, precluding the possibility of adequate residence time. Therefore, these SNCR technologies are considered technically infeasible.

An investigation of two possible **operational changes** to the EAF system was conducted. An evaluation was conducted by Goodfellow Associates in Ontario, Canada to determine the effects of varying the air gap opening between the movable hood on the furnace roof and the fixed DSE duct on the emissions of CO and NOx from the EAF. The opening of the air gap controls the amount of cool ambient air (oxygen) introduced to the DSE gas stream. Although testing has not been completed and published, the general trend line appears to suggest an inverse relationship between CO and NOx emissions for various air gap openings (i.e., ambient air inflow rates and off gas temperatures). That is, decreases in NOx emissions may result in increases in CO emissions. Variation of the **air gap opening** is considered an unproven operational change for reducing NOx emissions from the EAF, and is therefore technically infeasible.

Control Technology Feasibility Study for the Continuous Caster:

The caster is a negligible source of NOx emissions. The ladle-to-tundish steel teeming operation at Beta Steel effectively precludes thermal NOx formation from the contact of high temperature liquid steel with nitrogen in air. NOx emissions from the oxy-fuel slab cut off torch at the exit end of the caster are trivial. There are no known NOx control approaches for a continuous caster. No entries in the RBLC address NOx control at continuous casters.

NOx Emission Limits for EAFs of Other State and Federal Permits:

Source Name	Capacity, tons/hr	Products	Emission Limitations, lb/ton	
			NOx	Comment
Arkansas Steel, AK	50	Billets	1.0	Not yet tested
Stafford Railsteel, AK	125	Unknown	0.52	Unknown
Gallatin Steel, KY	200	Cold Rolled Steel	0.51	In compliance
Mac Steel, AK	86	Round Bars	0.51	Unknown
NUCOR Steel, AK	475	Slabs, Sheets	0.51	In compliance
NUCOR Steel, IN	260	Flat Rolled Products	0.50	In compliance
Qualitech Steel, IN	135	Flat Rolled Products	0.50	Not yet tested
NUCOR-Yamato Steel, AK	350	Blooms, Beams	0.38	In compliance (CEM)
Roanoke Electric Steel, VA	100	Structural Steel	0.378	In compliance
NUCOR Steel, SC	165	Structural Beam	0.35	In compliance
Trico Steel, AL	440	Thin Slabs, Structural Coils	0.35	Testing not required
Steel Dynamics, IN	200	Flat Rolled Products	0.35	Not yet tested
Tuscaloosa Steel, AL	160	Thick Slabs, Structural Coils	0.35	In compliance
Proposed Beta Steel, IN	**151**	**Flat Rolled Products**	**0.35***	**This is the proposed limit**
IPSCO Steel, IA	200	Coil Strip/Plate, Discrete Plate	0.27	Out of compliance (Requesting 0.5 lb/ton limit)

* The NOx emission limit for the combined Meltshop exhaust is 0.45 lb/ton of steel. This limit includes emissions from EAF, LMF, Caster and other ancillary natural gas burners. The NOx emission factor for EAF is at 0.35 lb per ton of steel, which is comparable to similar facilities.

Review of the RBLC indicates a wide range of NOx BACT emission limits for EAF's (0.27 lb/ton - 1.0 lb/ton). IPSCO Steel in Iowa established the lowest BACT emission limit of 0.27 lb NOx/ton. According to the Quay Deter of Iowa Dept. of Natural Resources, the facility tested out of compliance with this limit. As a result, IPSCO Steel is requesting a modification of the emission limit from 0.27 lb NOx/ton to 0.5 lb NOx/ton. Because IPSCO Steel has not met compliance with the NOx emission limit for the meltshop, it does not represent BACT.

Three facilities have established the next lowest BACT emission limit of 0.35 lb NOx/ton. Nucor-Yamato Steel in South Carolina and Tuscaloosa Steel in Alabama have both tested in compliance with this limit. The third facility, Trico Steel in Alabama, is not required to test. Because Nucor Steel in South Carolina and Tuscaloosa Steel in Alabama have demonstrated compliance with the NOx emission limit for the meltshop, it represents BACT.

(3) Modeling Analysis

The modeling analysis included in Appendix A, shows that the increase in NOx emissions does not have a significant impact on the area.

(4) Conclusion

Based on NOx stack tests performed by Beta Steel, the meltshop is not in compliance with the NOx emission limitation in CP-127-2326. Beta Steel requested that the NOx limit be relaxed to be consistent with subsequent BACT determinations for similar meltshops. OAQ's review of meltshop emission calculations, BACT analysis, and meltshop emission limits established in other state and federal permits supports an adjustment of the **NOx emission limit from 0.15 lb/ton to 0.45 lb/ton.** The stack test results indicate that the meltshop can comply with the proposed emission limitation.

(B) Sulfur Dioxide Emissions from the Meltshop

(1) Meltshop Emission Calculations

The meltshop consists of an electric arc furnaces equipped with a direct shell evacuation (DSE) systems, ladle metallurgy furnaces, continuous casters, and natural gas combustion units. The following emission calculations for the meltshop were determined for Construction Permit CP-127-2326 issued on February 24, 1992:

Original Meltshop SO2 Emissions limits:

Facility	Maximum Capacity	SO2 Emission Factor	Source	Potential SO2 Emissions		
				lbs/hr	tons/yr	lb/ton
EAF No. 1	62.8 tons/hr	0.047 lb/ton	Nucor application	2.95	12.9	
EAF No. 2	62.8 tons/hr	0.047 lb/ton	Nucor application	2.95	12.9	0.047
LMF No. 1	62.8 tons/hr	No Data	No Data	---	---	---
LMF No. 2	62.8 tons/hr	No Data	No Data	---	---	---
Caster No. 1	62.8 tons/hr	No Data	----	---	---	
Caster No. 2	62.8 tons/hr	No Data	-----	---	---	---
NG Comb [1]	34 MMBtu/hr	0.6 lb/MMCF	AP-42, 1989	0.02	0.09	0.0003
Totals:				5.92	25.9	**0.047**

[1] Natural Gas Combustion Units consist of two (2) 10 MMBtu/hr natural gas-fired ladle preheat stations, two (2) 5 MMBtu/hr natural gas-fired ladle dryout stations, and two (2) 2 MMBtu/hr tundish dryout and preheat stations.

The revised emission calculations are based on updated emission factor information relating to meltshop emissions. The original emission calculations were based on limited available information. This updated information is more representative of the actual emissions emitted

from meltshop operations:

Updated Meltshop SO2 Emissions limits:

Facility	Maximum Capacity	SO2 Emission Factor	Source	Potential SO2 Emissions		
				lbs/hr	tons/yr	lb/ton
EAF	151 tons/hr	0.25 lb/ton	Stack Test [1]	37.75	165.34	0.25
LMF	151 tons/hr	0.08 lb/ton	Stack Tests [2]	12.1	52.9	0.08
Caster	151 tons/hr	No Data	--	---	---	---
NG Comb [3]	44 MMBtu/hr	0.6 lb/MMCF	AP-42, 1/95	0.03	0.11	0.002
Totals:				49.88	218.4	**0.33**

[1] The SO2 emission factor for EAF was determined using the material balance calculations submitted by Beta Steel and also analyzing similar calculations for Steel Dynamics – IN permit.

[2] The SO2 emission factor was determined by calculating the average emissions from available stack tests for LMFs (Roanoke Electric Steel, VA - 0.06 lb/ton and Inland Steel, IN - 0.1 lb/ton).

[3] Natural Gas Combustion Units consist of three (3) 11.5 MMBtu/hr natural gas-fired ladle preheat/holding stations with low NOx burners, one (1) 6 MMBtu/hr natural gas-fired ladle preheat/holding stations with low-Nox burners, one (1)) 3.5 MMBtu/hr tundish dryout and preheat stations, one (1) CoJect system including oxyfuel burners and one (1) oxy-fuel cutoff torch at the exit end of the caster.

(2) BACT Analysis

SO2 Formation:

At the meltshop, the materials used to produce and refine liquid steel in the EAF and LMF contain sulfur. Sulfur is present in varying quantities in steel scrap mix components, charge carbon materials, injected carbon materials, fluxes and metallurgical additives. The sulfur introduced to the EAF and LMF with the input materials must be balanced by removing undesired sulfur with the output slag to achieve the desired sulfur content of the liquid steel, which is converted to solid steel products. Sulfur is removed from liquid steel primarily by the addition of fluxing agents (e.g., high calcium lime, dolomitic lime, etc.) which react with the undesired elements in the liquid steel, including sulfur, to form slag which floats on top of the liquid steel baths in the EAF and LMF.

The SO2 emissions result from the oxidation of sulfur in the EAF and LMF input materials. The slag and baghouse dust contains a large portion of the oxidized sulfur from the steel. The portion not captured in either the baghouse dust or the slag is emitted through the baghouse stack to the atmosphere, primarily in the form of SO2.

Because the meltshop is enclosed, almost all of the sulfur compounds in the particulate form are removed from the gas stream by fabric filtration and report to the baghouse dust. Almost all of the sulfur compounds in gaseous form (almost entirely in the form of SO2) pass through the baghouse and exhaust to the atmosphere.

Control Technology Technical Feasibility Study:

The following technologies for control of SO2 emissions from the EAF and LMF were evaluated:

(a) Flue Gas Desulfurization

- Wet Scrubbing
- Spray Dryer Absorption
- Dry Sorbent Injection

(b) Charge Material Substitution

- Scrap Selection
- Injection Carbon

Current **flue gas desulfurization (FGD) technologies** for SO2 control include wet and dry scrubbers. Both approaches are Aend-of-pipe@ control technologies, since flue gas is a process byproduct, not an input material. Flue gas desulfurization as a control approach for SO2 abatement has not been applied to any EAF meltshops primarily because the concentrations of SO2 in EAF and LMF off-gases are well below minimum concentrations required for the technology.

Wet scrubbers are regenerative processes that are designed to maximize contact of the scrubbant (an SO2 reactive additive, such as 10 percent slaked lime slurry) with the exhaust gas. Wet scrubbers have not been employed for EAF meltshop SO2 control applications because of the problems associated with their operation in a meltshop environment. One major problem with wet scrubbers is their inability to tolerate high particulate loading in the incoming stream due to plugging of spray nozzles, packing, plates and trays. In addition, wet scrubbers are steady-state control devices, which are innately incompatible with the highly variable loading in EAF and LMF off-gases. If the wet scrubber was installed downstream of the particulate control device, SO2 concentrations would be too low due to the additional exhaust process gases from the meltshop. For these reasons, the wet scrubber is considered technically infeasible.

The **spray dryer absorption** technology could be installed at the exit of the DES. At this location, SO2 concentration is highest in the system (approximately 20 ppm). At these low concentrations, SO2 removal is ineffective and the highly reactive elements introduced into the exhaust stream would require the use of either Teflon or other chemically resistant bags at the meltshop baghouse. In addition, the physical constraints (space limitations) of the system in place at Beta Steel make it impracticable to install this system. Therefore, this option is considered to be technically infeasible.

The **dry sorbent injection system** is not a high performance control technology. Since no spray tower or mixing chamber is used to enhance mixing, lower pollutant/scrubbant contact (and, hence, lower SO2 control) levels occur. The resultant level of SO2 control is only moderate, especially in dry gas streams with dilute SO2 concentrations. The use of hydrated lime as a reagent historically approaches 50% removal effectiveness for 100-3000 ppm of SO2. However, the maximum estimated SO2 concentration at the exit of the DES is below 20 ppm. Thus, the EAF exhaust has only one fifth of the minimum SO2 concentration needed to approach 50 percent removal efficiency. Stack test data indicates low moisture levels in the EAF exhaust which, in combination with the low pollutant concentration, would result in difficulty obtaining sufficient mass transfer to realize effective control of SO2. The stoichiometry is expected to increase by an order of magnitude and result in control in the 20-25 percent range or less. These difficulties of implementation and low control performance are part of the reasons that this technology has not been applied for SO2

emissions control at an EAF. The highly reactive elements that would be introduced into the exhaust stream would require the use of either Teflon or other chemically resistant bags in the meltshop baghouse. This is an additional reason that this approach has not been applied at other EAF meltshops. Thus, the application of dry sorbent injection is considered to be technically infeasible.

Sulfur is present in varying contents in the steel scrap mix components, charge carbon materials, injected carbon materials, fluxes and metallurgical additives. Scrap and injected carbon comprise almost all (95 percent) of the total sulfur input to the EAF under current operations. With respect to the total meltshop sulfur input, scrap contributes 47 percent and injected carbon contributes 48 percent. Therefore, evaluation of **charge material substitution** with lower sulfur contents was conducted.

The overall sulfur content of **scrap** charged at the EAF is affected by the scrap mix (weight proportions of scrap types) charged into the EAF and the sulfur content of each scrap type. The scrap mixes used at Beta Steel are dictated by the metallurgical requirements of the liquid steel produced in the EAF and the operating constraints of the EAF and LMF relative to control of the sulfur content of liquid steel. The sulfur contents of the scrap mix components are fixed by the sulfur contents of the virgin steel that was scrapped. Although Beta Steel specifies maximum sulfur contents in scrap, there is no real-time control over these sulfur contents. There is no scientifically sound sampling method for measuring the overall sulfur contents of individual scrap shipments received at the plant. Noncompliance with the scrap sulfur specifications can only be investigated after the scrap is used and metallurgical problems encountered. Therefore, scrap management as a quantitative, preemptive SO2 control method is technically infeasible.

The SO2 emissions are affected by the sulfur content of the **injected carbon material** used at the EAF. Commercially available injected carbon material are shown in the following table:

Material	Nominal Percent Sulfur by Weight
Petroleum Coke	2.2
Anthracite Coal	0.8
Metallurgical Coke	0.6
Low Sulfur Anthracite Coal	0.6
Synthetic Graphite	0.05
Desulfurized Coke	0.02

Charge substitution with lower sulfur-bearing raw materials is considered technically infeasible. Beta currently utilizes petroleum coke, which has a higher sulfur content than metallurgical coke and coal. However, the higher carbon content associated with the petroleum coke increases the foaming action of the slag, thereby increasing its capacity to reduce SO2 emissions and NOx emissions. The faster the foamy slag will be created, the less time the EAF electrodes will be exposed to the nitrogen-laden atmosphere inside the furnace, decreasing the amount of NOx emissions generated.

Meltshop Emission Limits of Other State and Federal Permits:

Source Name	Capacity, Tons/hr	Products	Emission Limitations, lb/ton	
			SO2	Comment
Mac Steel, AK	86	Round Bars	1.05	Unknown
Arkansas Steel, AK	50	Billets	0.7	Not yet tested
Beta Steel, IN	**151**	**Flat Rolled Products**	**0.25***	**Proposed revised limit**
Steel Dynamics, IN	200	Flat Rolled Products	0.25	Not yet tested
Gallatin Steel, KY	200	Cold Rolled Steel	0.2	In compliance
NUCOR Steel, AK	475	Slabs, Sheets	0.2	In compliance
NUCOR Steel, SC	165	Structural Beam	0.2	In compliance
Tuscaloosa Steel, AL	160	Thick Slabs, Structural Coils	0.20	In compliance - Non PSD pollutant
NUCOR Steel, IN	260	Flat Rolled Products	0.20	In compliance
Qualitech Steel, IN	135	Flat Rolled Products	0.20	Not yet tested
Roanoke Steel, VA	100	Structural Steel	0.167	In compliance - Coke (a significant source of S) not used in process
NUCOR-Yamato Steel, AK	350	Blooms, Beams	0.15	In compliance (CEM)
Trico Steel, AL	440	Thin Slabs, Structural Coils	0.09	Testing not required
Stafford Railsteel, AK	125	Unknown	0.07	Noncompliance, (Request 0.14 lb/ton limit)
IPSCO Steel, IA	200	Coil Strip/Plate, Discrete Plate	0.06	Noncompliance (>0.7 lb/ton...high due to pigiron)

* The SO2 emission limit for the Meltshop exhaust is 0.33 lb/ton of steel. This limit includes emissions from EAF, LMF, Caster and other ancillary natural gas burners. The SO2 emission factor for EAF is at 0.25 lb per ton of steel.

Review of the RBLC indicates that all steel mills listed don't have add-on control devices to control SO_2 emissions from EAFs. Most steel mills listed, including Steel Dynamics, Inc. (SDI) in DeKalb County, Indiana, were given a limit of 0.2 lb/ton and all of which have tested in compliance.

There is a wide range of SO2 BACT emission limits for meltshops (0.06 lb/ton - 1.05 lb/ton). IPSCO Steel in Iowa established the lowest BACT emission limit of 0.06 lb SO2/ton. According to the Iowa Department of Natural Resources, the facility tested out of compliance with this limit (>0.7 lb SO2/ton). Stafford Railsteel in Arkansas established the next lowest BACT emission limit of 0.07 lb SO2/ton. According to the Shawn Hutchinges of Arkansas Department of Environmental Quality Shan, the facility was never built and therefore will not be considered in the BACT. Because the above facilities have not met compliance with their respective SO2 emission limits for the meltshop, they do not represent BACT.

Trico Steel in Alabama established the third lowest BACT emission limit of 0.09 lb SO2/ton. This facility is not required to test because it is a non-PSD pollutant. Because there is no

data to support this emission limit, it does not represent BACT.

Nucor-Yamato Steel in South Carolina established the fourth lowest BACT emission limit of 0.15 lb SO2/ton. This plant tested in compliance with the emission limit. Nucor-Yamato Steel in South Carolina has demonstrated compliance with the NOx emission limit for the meltshop. Nucor-Yamato Steel is able to demonstrate compliance with the SO2 limit because they utilize a petroleum coke product with a sulfur content of less than 2 percent.

Since sulfur dioxide emissions are based on the amount of sulfur in the raw materials (i.e., steel scrap, DRI, charge and injection carbon), the amount of sulfur removed through the slagging process, and the amount of sulfur left in the steel product, a material balance was performed by Beta Steel to estimate the uncontrolled SO_2 emission rate from the EAF. Calculations indicate that uncontrolled SO_2 emission rate from melt shop of 50 lbs/hr. At a maximum steel production rate of 151 lb/ton, this emission rate is equivalent to 0.33 lb/ton.

(3) Modeling Analysis

The modeling analysis, included in Appendix A, shows that the increase in SO2 emissions does not have a significant impact on the area.

(4) Conclusion

Based on SO2 stack tests performed by Beta Steel, the meltshop is not in compliance with the SO2 emission limitation in CP-127-2326. Beta Steel requested that the SO2 limit be relaxed to be consistent with subsequent BACT determinations for similar meltshops. OAQ's review of meltshop emission calculations, BACT analysis, and meltshop emission limits established in other state and federal permits support an adjustment of the **SO2 emission limit from 0.047 lb/ton to 0.33 lb/ton.** The stack test results indicate that the meltshop can comply with the proposed emission limitation.

(C) VOC Emissions from the Meltshop

(1) Meltshop Emission Calculations

The meltshop consists of electric arc furnaces equipped with a direct shell evacuation (DSE) systems, ladle metallurgy furnaces, continuous casters, and natural gas combustion units. The following emission calculations for the meltshop were determined for Construction Permit CP-127-2326 issued on February 24, 1992:

Original Meltshop VOC Emissions limits:

Facility	Maximum Capacity	VOC Emission Factor	Source	Potential VOC Emissions		
				lbs/hr	tons/yr	lb/ton
EAF No. 1	62.8 tons/hr	0.13 lb/ton	RBLC[1]	8.16	35.7	0.13
EAF No. 2	62.8 tons/hr	0.13 lb/ton	RBLC[1]	8.16	35.7	
LMF No. 1	62.8 tons/hr	No Data	No Data	---	---	---
LMF No. 2	62.8 tons/hr	No Data	No Data	---	---	---
Caster No. 1	62.8 tons/hr	No Data	No Data	---	---	---
Caster No. 2	62.8 tons/hr	No Data	No Data	---	---	---
NG Comb [2]	34 MMBtu/hr	5.5 lb/MMCF	AP-42, 1989	0.18	0.8	0.006
Totals:				16.6	97.1	**0.13**

[1] The emission factor was based on other permits for similar sources with EAFs (Nucor Steel plant – IN) at 0.13 lb/ton.

[2] Natural Gas Combustion Units consist of two (2) 10 MMBtu/hr natural gas-fired ladle preheat stations, two (2) 5 MMBtu/hr natural gas-fired ladle dryout stations, and two (2) 2 MMBtu/hr tundish dryout and preheat stations.

Beta steel conducted extensive unit by unit testing at the meltshop in August 2000. The results of these tests were presented to IDEM OAQ along with this request. The VOC testing was carried out at pickup points for Caster, total of Caster and Canopy, DES (4th hole) and baghouse stack.

The revised emission calculations are based on updated emission factor information relating to meltshop emissions. The original emission calculations were based on limited information available at the time. This updated information is more representative of the actual emissions from the meltshop operations:

Updated Meltshop VOC Emissions limits:

Facility	Maximum Capacity	VOC Emission Factor	Source	Potential VOC Emissions		
				lbs/hr	tons/yr	Lb/ton
EAF	151 tons/hr	0.13 lb/ton	Stack Tests and RBLC[1]	19.63	85.97	0.13
LMF	151 tons/hr	--	--	--	--	--
Caster	151 tons/hr	0.02 lb/ton	Stack Test	4.27	18.7	0.02
NG Comb [3]	44 MMBtu/hr	5.5 lb/MMCF	AP-42, 7/98	0.24	1.04	0.002
Totals:				24.08	105.47	0.152

[1] The VOC emission factor for EAF was determined based on available information about existing limits on similar EAFs (Steel Dynamics – IN 0.13 lb/ton and Nucor Steel – IN 0.13 lb/ton) as part of

the BACT determinations.

[2] The August 2000 stack test performed by Beta Steel was performed at various pick up points for the Caster and Canopy. The emissions from the Caster were quantified based on that stack test.

[3] Natural Gas Combustion Units consist of three (3) 11.5 MMBtu/hr natural gas-fired ladle preheat/holding stations with low NOx burners, one (1) 6 MMBtu/hr natural gas-fired ladle preheat/holding stations with low-Nox burners, one (1)) 3.5 MMBtu/hr tundish dryout and preheat stations, one (1) CoJet System including oxyfuel burners and one (1) oxy-fuel cutoff torch at the exit end of the caster.

(2) BACT Analysis

When the original permit CP127-2326-00036 was issued on February 24, 1992, Beta Steel was located in non-attainment area for Ozone. This project was a minor under Emissions Offset review because the potential to emit of VOCs was limited to less than 100 tons per year. The potential to emit for VOC was greater than 25 tons per year. Therefore the meltshop was subject to requirements of 326 IAC 8-1-6 (BACT) for VOC control.

VOC emissions from the EAF will be generated due to the volatilization of organic compounds (e.g., oils and paints) present in the scrap metal during charging of the scrap into the furnace.

Control Technology Technical Feasibility Study:

In the steel industry, **Direct Shell Evacuation Control (DEC) systems** (i.e., “fourth hole” furnace control system) is the primary control technology for controlling CO and VOC emissions from EAFs. A DEC system consists of a water-cooled duct connected to the EAF through the furnace roof’s “fourth hole”. This duct is connected to the melt shop canopy collector system. During melting and refining, a slight negative pressure is maintained within the furnace to withdraw exhaust gases through the DEC duct. At the point there the DEC duct meets the “fourth hole”, there is an adjustable gap that allows combustion air to enter, providing oxygen to oxidize the CO which is present. The DEC system allows excellent process emissions capture and combustion of CO, and requires the lowest air volume of other EAF capture devices. Therefore, DEC system control is considered technically feasible.

The DEC system along with the scrap management plan is considered BACT for VOC emissions.

VOC Emission Limits for EAFs of other State and Federal Permits:

Source Name	Capacity, tons/hr	Products	Emission Limitations, lb/ton	
			VOC	Comment
Arkansas Steel, AK	50	Billets	0.35	Not yet tested
Stafford Railsteel, AK	125	Unknown	0.09	Unknown
Gallatin Steel, KY	200	Cold Rolled Steel	0.13	In compliance
Mac Steel, AK	86	Round Bars	0.13	Unknown
NUCOR Steel, AK	475	Slabs, Sheets	0.09	In compliance
NUCOR Steel, IN	260	Flat Rolled Products	0.13	In compliance
Qualitech Steel, IN	135	Flat Rolled Products	0.15	Not yet tested
NUCOR-Yamato Steel, AK	350	Blooms, Beams	0.13	In compliance (CEM)
Roanoke Electric Steel, VA	100	Structural Steel	0.35	In compliance
NUCOR Steel, SC	165	Structural Beams	0.13	In compliance
Steel Dynamics, Butler, IN	200	Flat Rolled Products	0.13	In compliance
Steel Dynamics, Columbia City, IN	200	Structural Beams	0.09	Limitation only for the EAF. The Permittee proposes use of DRI as substitute for scrap. Also equipped with thermal oxidizer
Tuscaloosa Steel, AL	160	Thick Slabs, Structural Coils	0.13	In compliance
Proposed Beta Steel, IN	**151**	**Flat Rolled Products**	**0.13***	**This is the existing limit**
IPSCO Steel, IA	200	Coil Strip/Plate, Discrete Plate	0.13	In compliance

* The VOC emission limit for the Meltshop exhaust is 0.15 lb/ton of steel. This limit includes emissions from EAF and Caster and other ancillary natural gas burners. The VOC emission factor for EAF is at 0.13 lb per ton of steel, which is comparable to similar facilities.

Review of the RBLC indicates a wide range of VOC BACT emission limits for EAF's (0.09 lb/ton – 0.35 lb/ton). Most steel mills listed in the RBLC, including Beta Steel, were given a limit of 0.13 lb/ton. NUCOR Steel Corporation in Blytheville, Arkansas was given a VOC limit of 0.09 lb/ton. According to the company and a staff member of the Arkansas Department of Pollution Control (ADPC), the reason why NUCOR Steel can justify a lower limit is due to its use of very high grade scrap for the production of flat rolled products. High grade scrap includes, but is not limited to, scrap with very low sulfur content. Sulfur causes imperfections on the steel. Steel scrap like turnings which are relatively used more for structural steel production are considered low grade scrap. Incidentally, they also have a relatively high organic compounds (oils) levels. The Steel Dynamics facility in Columbia City, Indiana also has the VOC emission limit at 0.09 lb/ton. As explained in the permit for this facility the Permittee proposes to use Direct Reduced Iron (DRI) as substitute for the scrap material. The DRI contains minimal VOCs and is manufactured at the SDI plant in Butler, Indiana. Since, Steel Dynamics has not yet stack tested the EAF for VOC, this lower limit is so far undemonstrated with or without the use of DRI. Beta does not use DRI as the feedstock for its EAF and will be producing low grade steel for guard rail and trailers, therefore 0.13 lb/ton instead of 0.09 lb/ton is BACT. This is consistent with previous VOC limitations imposed on other similar steel mills.

(3) Performance Test Analysis

The IDEM, OAQ discussed the details of VOC emissions with other state agencies and sources listed in the above table to determine the optimum methodology used to demonstrate compliance. In these discussion it was observed that at certain plants, where the EAF is located in a completely enclosed meltshop where exhaust gases from different equipment in the steel manufacturing process are directed to single baghouse and stack, increased VOC emissions are observed. It transpired that the VOC emissions observed at these plants, when speciated showed high proportion of methane (a natural constituent of natural gas and classified as negligible photochemical reactive compound, hence non VOC in 40 CFR 51 Subpart F).

Based on these discussions, IDEM, OAQ recommended to the Permittee to conduct VOC testing at their meltshop and also speciate the emissions to determine the extent of exempt constituent of the emissions. This testing was conducted on June 24 and 25, 2002. The results of these tests show that on average methane comprises 52.7% of the total gaseous organic emissions observed during the test. Therefore, the VOC emissions from the meltshop exhaust were found to be in compliance with the limit proposed in this permit.

(4) Compliance issues

IDEM, OAQ held discussions with the Permittee, other state, local and federal agencies and similar sources located elsewhere on the compliance demonstration issues. From the information collected, IDEM, OAQ concluded that the VOC emissions from this unique design of meltshop do contain a large component of non-VOC organic compounds (like Methane). Therefore, if the Methane component can be subtracted from the total organic emissions to calculate the VOC emissions from the meltshop. Therefore IDEM OAQ is making two changes in the modified permit to allow the following:

(i) To allow the Permittee to use U.S. EPA Method 25 or Method 25 A and calculate total organic emissions on ‘as carbon’ basis from the baghouse stack of the meltshop. The Permittee will also be allowed to simultaneously conduct testing to determine methane emissions from the meltshop exhaust along with the total organic test. The Permittee can subtract the methane emissions from the total organic emissions to show compliance with the applicable VOC limit to the meltshop emissions;

(ii) In June 2002, the Permittee conducted extensive testing for the VOC emissions at the meltshop which comprised of multiple heats. The result of this testing indicated that due to the fluctuations in the emissions from the individual heats, it is more representative to use data from 3 runs to demonstrate compliance with the VOC limit, where each run can consist of up to two (2) heats (each heat lasts approximately 1 hour). Therefore, the modified permit will allow the Permittee to conduct the stack test for VOC emissions based on three runs where each run can consist of up to two (2) heats.

(5) Modeling Analysis

The modeling analysis included in Appendix A, shows that the increase in VOC emissions does not have a significant impact on the area.

(6) Conclusion

<u>Short term limit</u>
Based on VOC stack tests performed by Beta Steel, the meltshop is not in compliance with the VOC emission limitation in CP-127-2326. Beta Steel requested that the VOC limit be relaxed to account for emissions from the Caster. OAQ review of meltshop emission calculations, BACT analysis, and meltshop emission limits established in other state and

federal permits support an adjustment of the **VOC emission limit from 0.13 lb/ton to 0.15 lb/ton.** The VOC emission limit in lb/hour being redundant will be removed from the permit.

Annual Limit
The annual VOC emissions from the entire plant were below 100 tons. This ensured a minor status for this source under Emission Offset rules. After the issuance of the permit CP 127-2326, the source has constructed only one EAF, one LMF and one Caster. In addition Beta has not constructed the second hot strip mill authorized in the same permit. Since the authorization to construct has since expired, the second hot strip mill shall not be constructed. The following was the distribution of VOC emissions PTE as per the CP above:

Meltshop – 73.5 tons per year
Existing Hot Strip Mill – 9.7 tons per year
New Hot Strip Mill – 9.7 tons per year

Therefore, additional VOC emissions allowances from the new hot strip mill are available to the Meltshop due to this change in limit. Therefore, the annual emissions from the meltshop shall be limited to 73.5+9.7= 83.2 tons per year. With the steel production rate of 1.1 million tons per year and VOC emission limit of 0.15 lb/ton, the meltshop exhaust will show compliance with this annual limit. Therefore, the annual VOC emissions limit will be changed from **73.5 tons per year to 83.2 tons per year.**

(D) PM10 Emissions from the Meltshop

Beta has requested to clarify the PM-10 components for the meltshop emissions. The PM-10 emissions from the meltshop include both filterable and condensable components. This has been added to the operation condition 1.

Meltshop Emission Limit Determination

Operation	Emission Units	Present Limits			Proposed Limits		
		NOx	SO2	VOC	NOx	SO2	VOC
Meltshop Operation	lbs/ton steel	---	0.047	0.13	0.45	0.33	0.15
	lbs/hr	22.2	5.9	16.8	68.6	49.9	----
	tons/yr	97.4	26.0	73.5	300.5	218.4	83.2

SLAB REHEAT FURNACE

The slab reheat furnace at Beta's source consists of natural gas fired burners with maximum heat input capacity of 264.6 million Btu per hour. The slab reheat furnace is equipped with a Selective Catalytic Reduction (SCR) system to control NOx emissions from natural gas combustion. The NOx emissions from the furnace are limited to 14.7 lb/MMSCF of natural gas burned and 3.13 pounds per hour and 13.7 tons per year. The PM/PM-10 emissions shall be limited to 5 lb/MMSCF of natural gas burned and 1.06 lb/hour. The following table shows the information from various stack tests performed at this facility.

	NOx		PM/PM-10	
	Lb/hour	Lb/MMSCF	Lb/hour	Lb/MMSCF
Permit limit in CP 127-2326	3.13	14.7	1.06	5.0
January 1998	5.19	22.4	1.05	4.5
March 1999	3.86	17.7	5.26	24.8
November 1999	18.88	77.06	3.18	13.1

Beta Steel is requesting that the NOx and PM/PM-10 limits be revised to be consistent with subsequent BACT determinations for similar reheat furnace operations. The OAQ conducted the following investigation to determine the appropriate limits for the Slab Reheat Furnace. This investigation includes a review of state and federal emission limits, stack test results, and updated emission factor information.

Slab Reheat Furnace Evaluation

The reheat furnace consists of natural gas fired burners with maximum heat input rate of 264.6 MMBtu per hour. The cut slabs from the continuous caster enter the furnace to adjust the temperature to the proper rolling temperature.

(A) Nitrogen Oxide Emissions from the Reheat Furnace

(1) NOx Formation

Most of the NO_x for the reheat furnace will be generated as thermal NO_x, due to the thermal dissociation and subsequent reaction of nitrogen and oxygen molecules in the combustion air. Fuel NO_x will be a very minor contributor.

Control Technology Technical Feasibility Study:

The same control technologies evaluated for the EAF were also examined for potential use in controlling NO_x emissions from the reheat furnace. Beta has installed low-NO_x burners with a Selective Catalytic Reduction (SCR) system to control NOx.

The following table shows the control efficiencies for three different add-on control systems, technically feasible for reheat furnace application.

Add-on Control Option	% Efficiency
SCR	80
SNCR: Thermal DeNO$_x$®	50
SNCR: NO$_x$OUT®	50

The source already has installed the top alternative (SCR unit) for controlling NOx emissions from the reheat furnace. Therefore, no further economic analysis is required.

Further IDEM has investigated other sources listed in RBLC or information available with other state agencies for level of control achieved for a reheat furnace. The results are presented in the following table:

NOx Emission Limits for Reheat Furnace of Other State and Federal Permits:

Source Name	Capacity, MMBtu/hr	Emission Limitations, NOx lb/MMBtu
Stafford Railsteel, AK	146	0.171
Qualitech Steel, IN	175	0.15
Roanoke Electric Steel, VA	160 tph	39.9 lb/hour
NUCOR Steel, SC	125	0.19
Steel Dynamics, DeKalb IN	117	0.17
Steel Dynamics, Whitley IN	260	0.11
Existing permit limit for Beta Steel, IN	**264**	**0.014**

Review of the RBLC indicates a wide range of NOx BACT emission limits for reheat furnaces (0.014 – 0.171 lb/MMBtu).

Beta Steel is identified as most stringent BACT determination in the above list. Beta Steel has add-on control (SCR) to control NOx emissions from the reheat furnace. None of the other sources have add-on controls on the reheat furnaces.

In past, during annual stack testing Beta has demonstrated that due to the non-steady state nature of the process, it is not possible to maintain a consistent level of performance of the SCR unit. This results in a lowered efficiency of control for NOx emissions.

Following factors contribute to reduction in SCR control efficiency:

1. The reheat furnace operation is a non-steady state operation where emission rates vary depending upon heat input rate and material being heated.

2. Varying flue gas temperature at the inlet of SCR cause fluctuations in the Catalyst performance. The flue gas temperature drops down to 750^{o}F, well beyond the optimum performance range for the catalyst between 850-950 ^{o}F.

3. The catalyst performance is affected due to deposition of particulate matter from the flue gas stream. As it is not possible to run the gas through any kind of add-on control before the SCR, this factor is inherent to this application of SCR.

Therefore, Beta is requesting to relax the NOx emission limit on the reheat furnace to match the emission rates as observed during the performance test. This emission rate is still more stringent than the most stringent reheat furnace limit in the above table at Steel Dynamics in Whitley Indiana.

The revised emission limits for Beta Steel for NOx emissions and its comparison with Steel Dynamics is presented in the next table.

NOx emission rate for Slab Reheat Furnaces (comparison of Steel Dynamics and Beta Steel)

NOx emission limit units	Steel Dynamics, IN	Beta Steel, IN (proposed)
Lb/MMSCF		77.06
Lb/MMBtu	0.11	0.077
Lb/hour		18.88

As shown in the above table, the NOx emission rate limit for Beta Steel is still most stringent after this amendment to relax the limit. Therefore, the BACT level of control for Slab Reheat Furnace is achieved using low NOx burners and SCR at Reheat Furnace of Beta Steel.

(2) Modeling Analysis

The modeling analysis included in Appendix A, shows that the increase in NOx emissions does not have a significant impact on the area.

(3) Compliance Issues

The compliance demonstration and monitoring approach specified in the construction permit 127-2326-00036 and used at present by the Permittee for the NOx emissions from the reheat furnace is inadequate for use with SCR system. This approach consists of following:

1. A performance stack test to be conducted on annual basis to demonstrate compliance with the applicable NOx emission limit for the reheat furnace.

2. Conduct NOx stack tests six (6) months prior to the ending of the manufacturer's guarantee period.

The SCR system used to control NOx emissions operates with an integral NOx monitor and analyzer, which is used to control flow of Ammonia or Urea reactant to the SCR system to control NOx emissions. The flow of ammonia or urea is varied in proportion to the amount of NOx present in the inlet exhaust stream so that the controlled outlet exhaust stream has a NOx concentration and emission rate below the permitted level. To establish the compliance with the applicable requirements, as part of this permit amendment the Permittee will be required to install and operate a continuous emission monitoring system (CEMS) to monitor NOx emissions from the reheat furnace. The Permittee will be allowed a period of twelve (12) months from the effective date of this permit amendment 127-9642-00036 to install and operate the CEMS whenever the reheat furnace is being operated. The stack testing requirement in the permit for the NOx emissions from the reheat furnace will be deleted because the installation and use of the CEMS provides more accurate and continuous information about the NOx emissions from the furnace.

(4) Conclusion

Based on NOx stack tests performed by Beta Steel, the Slab Reheat Furnace is not in compliance with the NOx emission limitation in CP-127-2326. Beta Steel requested that the NOx limit be relaxed to be consistent with subsequent BACT determinations for other reheat furnaces. OAQ review of reheat furnace emission calculations, BACT analysis, and emission limits established in other state and federal permits support an adjustment of the **NOx emission limit from 14.7 lb/MMscf to 77.06 lb/MMscf and 18.88 lb/hour.** The stack test results indicate that the Reheat Furnace using low-NOx burners and SCR

can comply with the proposed emission limitation. A requirement to install and operate CEMS to monitor NOx emissions from the reheat furnace whenever the furnace is operated is added to the permit.

(B) PM/PM-10 (where PM-10 includes filterable and condensible component) Emissions from the Reheat Furnace

(1) PM/PM-10 Formation

Particulate matter in natural gas combustion is usually of larger molecular weight hydrocarbons that are not fully combusted. Trace amounts of mill scale from the steel slabs being heated will be exhausted.

There are two sources of the condensable particulate emissions from the combustion activity: condensable organic that are the result of incomplete combustion and sulfuric acid mist which is found as sulfuric acid dihydrate. For sources using natural gas fuel, such as the reheat furnace, there would be no condensable organic emitted because the main components of natural gas (i.e. methane and ethane) are not condensable at the temperature used in a Method 202 ice bath. As such, any condensed organic are from the ambient air. The most likely condensable particulate matter from natural gas-fired combustion sources is the sulfuric acid dihydrate, which results when the sulfur in the fuel and in the ambient air is combusted and cools.

An additional consideration of particulate matter generated in this process during combustion is the use of additional NO_X add-on control. When using SCR to control NO_X, PM/PM_{10} emissions increase due to the formation of ammonium nitrates and ammonium sulfates. Ammonia nitrate particles are formed when ammonia reacts with nitric acid, a derivative of NO_X emissions. Ammonia sulfate particles are formed when acid sulfate aerosols, formed during the oxidation of SO_2 emissions, react with excess ammonia.

The PM-10 (filterable) emission limit in the Beta Permit is 5 lb/MMscf. As PM-10 regulated under the Clean Air Act consists of filterable and condensable components, Beta was required to test for both components as part of the limit. This limit is even less than the AP-42 emission factor for combustion source only. The AP-42 emission factor (7/98) in chapter 1.4 for natural gas combustion for PM-10 (filterable and condensable components) is 7.6 lb/MMscf. This emission factor does not take into account the possible contribution to the condensable PM-10 by the SCR unit.

As there are no other Sources that have SCR control on the reheat furnaces, the OAQ, IDEM relied on the representative stack test information for this equipment to arrive at PM 10 limit. The representative stack test for the reheat furnace is from November 1999. The results of this stack test are shown in the following table:

November 1999 Test	PM 10 (Condensable component) lb/MMSCF
Run 1	9.34
Run 2	8.86
Run 3	10.3

The OAQ, IDEM evaluated the result described above and use the mean emission rate with 95% confidence interval for arriving at the new limit. The 95% confidence interval for mean emission rate for the condensable component of PM 10 is 11.3 lb/ MMSCF (based on standard deviation of 0.73 and mean of 9.5 lb/hour). As in the future testing Source has to show compliance with the new limit, the new limit should reflect the highest confidence level that the condensable emissions from this process shall be below that number.

The Beta Steel's quantified PM-10 (filterable and condensable) 95% confidence interval for mean emission rate of 16.3 lb/MMscf will be considered as BACT.

(2) Modeling Analysis

The modeling analysis included in Appendix A, shows that the increase in PM-10 (filterable and condensable) emissions does not have a significant impact on the area.

(3) Conclusion

Based on PM-10 (filterable and condensable) stack tests performed by Beta Steel, the Slab Reheat Furnace is not in compliance with the PM-10 (filterable and condensable) emission limitation in CP-127-2326. Beta Steel requested that the PM-10 (filterable and condensable) limit be relaxed to take into account the condensable component and contribution of SCR unit. The OAQ review of reheat furnace emission calculations, BACT analysis, and emission limits established in other state and federal permits support an adjustment of the **PM-10 (filterable and condensable) emission limit from 5 lb/MMscf to 16.3 lb/MMscf and 4.2 lb/hour.** The stack test results indicate that the Reheat Furnace using low-NOx burners and SCR can comply with the proposed emission limitation.

Recommendation

The OAQ recommends to the Commissioner that Operation Condition No. 1 and 7 of CP-127-2326 be amended as follows to incorporate revised emission limitations to the meltshop and reheat furnace operations. In addition changes are made to the condition for stack testing requirements to establish alternative conditions for VOC stack test on the meltshop and CEMs to monitor NOx emissions from the reheat furnace as discussed previously (bold-face characters represent language that has been added to the condition and strikeout characters represent language that has been removed from the condition):

General Conditions

1. Steel Furnace Meltshop – 1.1 million tons/year steel production capacity

- **a. One (1) Electric Arc Furnace (EAF) rated at 135 tons per heat, 151 tons per hour**
- **b. One (1) Ladle Metallurgy Station rated at 135 tons per heat, 151 tons per hour**
- **c. One (1) Continuous Caster rated at 151 tons per hour**
- **d. Three (3) 11.5 MMBTU /hr natural gas fired Ladle Preheat/Holding Stations**
- **e. One (1) 6 MMBTU/hr natural gas fired Ladle Preheat/Holding Station**
- **f. One (1) 3.5 MMBTU/hr natural gas fired Tundish Dryout and Preheat Station**
- **g. One (1) CoJet System including oxy-fuel burners**
- **h. One (1) Oxy-fuel cutoff torch at the exit end of the continuous caster**

Operating Conditions

1. That pursuant to 326 IAC 2-2-3(2), Best Available control Technology (BACT), ~~the two (2)~~ **the** EAF~~s~~ shall ~~each~~ be controlled by 140,000 acfm direct shell evacuation (DSE) system~~s~~. The combustion elbow at the DSE shall be designed to provide 200% excess air for the oxidation of CO and other present gaseous pollutants. These furnaces shall also be operated within the enclosed meltshop building under the canopy hood. The DSE and canopy hoods shall be ducted to the meltshop baghouse rated at ~~1.8~~ **1.0** million actual cubic feet per minute (MM acfm), demonstrating 100% capture. Pursuant to 326 IAC 2-2 and 6-5, a fugitive dust control and baghouse operation and maintenance program (Attachment A) shall be used to insure optimum compliance with the limitations contained herein. The operation of these furnaces shall each be further limited as follows:

PM a. That particulate matter (PM/PM10 **where PM-10 includes filterable and condensable components**) from the meltshop baghouse stack **(exhausting EAF, LMF, Caster and natural gas combustion units)** shall be limited to 0.0052 grains per dry standard cubic feet (gr/dscf) and 58.8 pounds per hour (257 tons/year).

b. That all PM/PM10 fugitive emissions generated during furnace operations shall be captured by the roof canopies or contained and collected within the meltshop building.

c. That visible emissions from any building opening as a result of EAF operation shall be limited to 3% opacity **based on a six-minute average (24 readings taken in accordance with 40 CFR Part 60, Appendix A, Method 9)**.

d. That visible emissions shall not be allowed (3% opacity) from any roof building opening as a result of the EAF dust handling system operation **based on a six-minute average (24 readings taken in accordance with 40 CFR Part 60, Appendix A, Method 9)**.

e. That except for scrap steel, slag and raw material handling and storage shall be conducted inside the meltshop ~~and material handling buildings exclusively. The material handling building shall recirculate exhaust air through a 99.9% efficient baghouse filter control, ensuring not more than 0.002 gr/dscf PM/PM10 exhaust from the baghouse, back into the building~~.

f. That the above conditions shall satisfy New Source Performance Standards (NSPS), 40 CFR 60, Subpart AAa. Pursuant to that rule, PM/PM10 emissions shall be limited to 0.0052 gr/dscf and 3% opacity at the common baghouse control device, 6% opacity for the meltshop due solely to the operations of any affected electric furnace, and 10% opacity from the dust handling system **based on a six-minute average (24 readings taken in accordance with 40 CFR Part 60, Appendix A, Method 9)**.

Note: Conditions c and d above impose more stringent restrictions for visible emissions from EAF operations than those specified in the NSPS or 326 IAC 5-1, 6-2, and 6-3.

SO2 g. That total sulfur dioxide (SO2) emissions from the meltshop **stack (exhausting EAF, LMF, Caster and natural gas combustion units)** shall be limited to **0.33** ~~0.047~~ pounds per ton of steel produced and **49.87** ~~5.9~~ pounds per hour (~~26.0~~ **218.4** tons per year) from the baghouse stack.

CO h. That carbon monoxide (CO) emissions from each EAF shall be reduced through thermal destruction in the direct shell evacuation (DSE) system elbow leading to the baghouse. Total meltshop stack **(exhausting EAF, LMF, Caster and natural gas combustion units)** CO emissions shall be limited to 817 pounds per hour (3,578.8 tons/year) from the baghouse. Pursuant to 326 IAC 9-1, CO concentrations shall be less than 20% of the maximum one (1) hour National Ambient Air Quality Standards (NAAQS) of 40 milligrams per cubic meter (40,000 ug/m3, 35 ppm). Modeling results indicate that CO will be less than 180 ug/m3 or 0.5% of the NAAQS.

VOC i. That volatile organic compound (VOC) emissions shall be controlled through a scrap management program to eliminate steel scrap with high residual oil content. Beta Steel Corp. shall charge only clean scrap, consistent with the Scrap Management Program detailed in Appendix C (copy enclosed). Combined meltshop processes **(consisting of EAF, LMF, Caster and natural gas**

combustion units) shall be limited to 0.13~~5~~ pounds of volatile organic emissions per ton of steel produced and ~~16.8 pounds per hour (73.5~~ **83.2** tons/year~~)~~ from the common stack.

NOx j. That emissions of nitrogen oxides (NOx) from all meltshop operations **(consisting of EAF, LMF, Caster and natural gas combustion units)** shall be limited to **0.45 pounds per ton of steel produced and 68.58** ~~22.2~~ pounds per hour (~~97.4~~ **300.5** tons/year) through the meltshop stack.

7. That pursuant to 326 IAC 2-2-3 (2) BACT, ~~each of two (2)~~ **the** Slab Reheat Furnace~~s~~ shall be limited as follows:

a. That only natural gas shall be burned and limited to 264.6 MMBtu/hr heat input ~~each~~.

PM b. That PM/PM-10 **(where PM-10 includes filterable and condensable components)** emissions shall be limited to ~~5.0~~ **16.3** pounds per million standard cubic feet (lb/MMscf) of natural gas burned and ~~1.06~~ **4.2** pounds per hour (~~4.65~~ **18.5** tons/year).

CO c. That CO emissions shall not exceed 40 lb/MMscf of natural gas burned and 8.5 pounds per hour (37.2 tons/year).

VOC d. That VOC emissions shall not exceed 1.7 lb/MMscf of natural gas burned and 0.4 pounds per hour (1.6 tons/year).

NOx e. That emissions of NOx shall be controlled by NOx control technology consisting of Low-NOx burners and an SCR unit and shall be limited to ~~14.7~~ **77.06** lb/MMscf (~~0.014~~ **0.077** lb/MMBtu) of natural gas burned and ~~3.13~~ **18.88** pounds per hour **on a three (3) operating hour average basis, except during periods of startup and shutdown** (~~13.7~~ **82.34** tons/year).

The following shall apply during periods of startup and shutdown:

(i) Startup is defined as the duration from the first firing of burners in the Reheat Furnace to the time when the exhaust gas temperature is within the optimum ranges of the operation of control device for NOx emissions.

(ii) Shutdown is defined as the duration from first curtailment of fuel input to the Reheat Furnace burners with the intent of full shutdown to the final complete stop of fuel input and complete cessation of combustion in the Reheat Furnace.

(iii) The Reheat Furnace shall be operated in a manner consistent with good air pollution control and work practices to minimize emissions during startup, and shutdown by operating in accordance with written procedures developed and maintained by the Permittee, which shall include at a minimum the following measures:

1. Review of operating parameters of the unit during startup, or shutdown as necessary to make adjustments to reduce or eliminate excess emissions;
2. Operate emission control equipment as soon as the Reheat Furnace exhaust gas temperature reaches the lower value of the optimum temperature range for the control equipment. This operation shall continue until the time the Reheat Furnace shutdown sequence is initiated with the intention of shutdown of the unit; and

3. Implementation of inspection and repair procedures for the Reheat Furnace and the emissions control equipment prior to attempting startup to ensure proper operation.

14. Stack Test Requirements:

That within 180 days of the start of operation and annually thereafter, emissions testing shall be performed in accordance with 326 IAC 3-2 to determine compliance with:

particulate matter (PM/PM10) emissions limits of Conditions 1a through f , 6 & 7b using EPA Method 5,

VOC limits of Conditions 1i & 7d using Method 25 **or Method 25 A**,

The Permittee can demonstrate compliance with meltshop VOC emission limit in Condition 1i by calculating 'Total Organic Compounds (TOC)' using 'as carbon' calculation. The Permittee if so desired can subtract the amount of methane observed during the VOC stack test from the TOC to calculate the non-methane VOC emissions to demonstrate compliance with the VOC emissions limit in condition 1i of the permit,

For the testing on the meltshop exhaust to demonstrate compliance with limits contained in the Condition 1, the Permittee shall meet the specifications for stack test protocol as specified in the applicable Method. The Permittee can choose to conduct the stack test in a manner where each test run can consist of up to 2 heats (where each heat lasts approximately one (1) hour) in the EAF at the meltshop.

carbon monoxide (CO) limits of Conditions 1h & 7c using EPA Method 10,

sulfur dioxide (SO2) limits of Conditions 1g ~~& 7c~~ using EPA Method 6, and

nitrogen oxides (NOx) limits of Conditions 1j ~~& 7e~~ using EPA Method 7.

~~In addition, SCR units shall be tested for NOx, as stated in condition No. 7e, six (6) months prior to the ending of the manufacturer's guarantee period.~~

Within twelve (12) months of effective date of this permit amendment 127-9642-00036, the Permittee shall install, calibrate, certify, operate and maintain a Continuous Emission Monitoring System (CEMS) for NO_X for the reheat furnace stack in accordance with 326 IAC 3-5-2 through 326 IAC 3-5-7.

(a) The CEMS shall measure NO_X emissions rates in pounds per hour to demonstrate compliance with the limitations established in the BACT analysis and set forth in the permit when the reheat furnace is in operation. The Permittee shall measure the amount of natural gas consumed in terms of million cubic feet per hour at the reheat furnace during the operation. To demonstrate compliance with the NO_X limits, the source shall take an average of the pounds of NOx per million cubic feet of natural gas used and pounds of NOx per hour over a three (3) operating hour period. The source shall maintain records of the emissions in pounds of NOx per million cubic feet of natural gas and pounds of NOx per hour.

(b) The Permittee shall determine compliance with Conditions 7e utilizing data from the NO_X CEMS, the fuel flow meter, and Method 19 calculations.

(c) The Permittee shall submit to IDEM, OAQ, within ninety (90) days after monitor installation, a complete written Monitoring Plan.

(d) The Permittee shall record the output of the system and shall perform the required record keeping, pursuant to 326 IAC 3-5-6, and reporting, pursuant to 326 IAC 3-5-7.

Pursuant to 40 CFR 60.47(d), the Permittee shall install, calibrate, certify and operate continuous emissions monitors for carbon dioxide or oxygen at each location where nitrogen oxide emissions are monitored.

The Permittee shall submit the records of excess NO_X emissions (defined in 326 IAC 3-5-7 and 40 CFR Part 60.7) from the continuous emissions monitoring system on a quarterly basis. These reports shall be submitted within thirty (30) calendar days following the end of each quarter to the following address:

Indiana Department of Environmental Management
Compliance Data Section, Office of Air Quality
100 North Senate Avenue, P. O. Box 6015
Indianapolis, Indiana 46206-6015

Note: COM of meltshop baghouse exhaust shall serve to satisfy the annual PM/PM10 test requirement for that stack, unless violation**s** have occurred during the past 12 month period.

The OAQ has also added the following conditions to demonstrate compliance with the revised VOC, SO2 and NOx limitations:

23. That pursuant to 326 IAC 2-2-3(a)(3), the Permittee shall comply with the following throughput limitations:

a. The maximum short-term metal production capacity from the meltshop shall not exceed 151 tons per hour; and

b. The maximum long-term metal production capacity from the meltshop shall not exceed 1,100,000 tons per year.

Records shall be maintained for a minimum of 60 months and submitted upon request.

Federal Rule Applicability

The changes proposed in this approval do not affect any limitations or compliance status of this Source which is subject to 326 IAC 12 and 40 CFR Part 60, Subpart AAa (Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983).

There are no additional New Source Performance Standards (326 IAC 12 and 40 CFR Part 60) that apply to the meltshop operation as a result of the proposed change.

There are no additional National Emission Standards for Hazardous Air Pollutants (40 CFR 63) that apply to the meltshop operation as a result of the proposed change.

State Rule Applicability

There are no additional State rules that apply to the meltshop operation as result of proposed change.

PSD Rule Applicability

This permit revision to emission limitations for the meltshop is not a modification pursuant to 326 IAC

2-2 and 40 CFR 52.21(b)(2) because it does not involve 'any physical change or change in the method of operation'. As part of this permit revision review process, the OAQ reevaluated BACT and remodeled the air quality impacts, in the *Meltshop Process Evaluation* section above, to demonstrate that the company is implementing BACT and is in compliance with the NAAQS and PSD increment. Therefore these changes are subject to the requirements of 326 IAC 2-2 (PSD).

Conclusion

The meltshop operation will be subject to the conditions of the attached proposed **Amendment Letter No. A-127-9642-00036.**

Beta Steel Corp. **CP 127-9642**
Portage, IN **Plt ID 127-00036**
Modeler: K. Gremos **05/30/03**

Air Quality Analysis

Introduction

Beta Steel Corp. (Beta) has requested a revision to their Prevention of Significant Deterioration (PSD) permit (CP 127 2326 A 127 7005) to establish emissions limits which accurately reflect the capability for short-term and long-term operations at its facility near Portage, Porter County, Indiana. The site is located at Universal Transverse Mercator (UTM) coordinates 486569.0 East and 4608207.0 North. The proposed emission adjustments will occur at the Meltshop Baghouse stack for Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), and Volatile Organic Compounds (VOCs). Porter County is designated as severe nonattainment for ozone and a portion of the county is unclassifiable/attainment for SO_2 and PM_{10}. Porter County is in attainment for all other criteria pollutants. The Office of Air Quality (OAQ) has performed this analysis to show whether or not the increase in SO2 and NOx from the Meltshop Baghouse stack will adversely affect the Ambient Air Quality Standard (NAAQS) or Prevention of Significant Deterioration (PSD) increment.

The request for a revision to the Prevention of Significant Deterioration (PSD) permit (CP 127 2326 A 127 7005) was received by the Office of Air Quality (OAQ) on April 2, 2001 and forwarded to the Technical Support and Modeling Section on September 27, 2001. This document provides the Technical Support and Modeling Section 's review of the revision request.

Executive Summary

Beta Steel Corp. has requested a revision to their PSD construction permit to adjust emission limits for NO_x, SO_2 and VOCs at the existing Meltshop Baghouse stack at its facility near Portage in Porter County, Indiana. NO_2 and SO_2 emission limits were modeled to determine whether impact from both short-term and long-term limits will remain below significant levels as previous modeling conducted for Beta Steel has shown. No significant impact was modeled. VOC emission limits at this stack increased by only 8.37 tons/year, which is below the 40 tons/year threshold. Therefore no analysis was performed for VOC. There will be no increase in Hazardous Air Pollutants (HAPs) emissions and no HAPs modeling is required. The closest Class I area is Mammoth Cave National Park in Kentucky. This lies outside the 100 km radius for Class I impact analysis.

Part A

Pollutants Analyzed for Air Quality Impact

IAC 2-2 PSD requirements apply in attainment and unclassifiable areas and require an air quality impact analysis of each regulated pollutant emitted in significant amounts by a major stationary source or modification. No physical changes or different methods of operations of the meltshop will occur as a result of this request. Beta's request is to establish NO_2 and SO_2 emissions limits reflective of the equipment currently operating at the site. Current permitted emission limits were revised from the original emission limits established in 1996. The 1996 emission limits were based on estimated emission factors, which have proved to be inaccurate. In Table 1, both current and proposed short and long-term emission factors are listed and were used to determine worst-case conditions.

TABLE 1 - Proposed Short-Term/Long-Term Emission Limits for Beta Steel Meltshop			
Averaging Limit	**SO2 Emission Limit**	**NOx Emission Limit**	**VOC Emission Limits**
Proposed Hourly Limit (lb/hr)	49.87	68.12	24.08
Current Hourly Limit (lb/hr)	5.92	22.2	16.6
Difference in Short-Term Limits (lb/hr)	**43.95**	**45.92**	**7.48**
Proposed Annual Limit (tons/yr)	218.3	298.08	105.47
Current Annual Limit (tons/yr)	25.9	97.1	97.1
Difference in Long-Term Limits (tons/yr)	**192.4**	**200.98**	**8.37**
Significant Emission Rates (tons/yr)	**40.0**	**40.0**	**40.0**

Part B

Modeling Analysis of Source Impact

The Office of Air Quality conducted modeling which used the Industrial Source Complex Short Term (ISCST3) model, Version 3, dated April 10, 2000 to determine maximum off-property concentrations or impacts for each pollutant. All regulatory default options were utilized in the United States Environmental Protection Agency (U.S. EPA) approved model, as listed in the 40 Code of Federal Register Part 51, Appendix W "Guideline on Air Quality Models". Stacks associated with Beta Steel are below Good Engineering Practice (GEP) stack heights. The aerodynamic downwash parameters were calculated using EPA's Building Profile Input Program (BPIP).

The meteorological data used in the ISCST3 model consisted of surface data from the City of South Bend merged with the mixing heights from Peoria, Illinois Airport National Weather Service Station for the five-year period (1990-1994). Meteorological data was obtained from the EPA Support Center for Regulatory Air Model electronic Bulletin Board and processed by PCRAMMET. OAQ modeling utilized Cartesian receptor grids out to 10 kilometers. Discrete receptors were placed 50 meters apart on Beta's property lines.

No increased PM_{10} emissions are expected as a result of the adjusted emission limitations for SO_2 and NO_2, therefore no modeling analysis for PM_{10} and $PM_{2.5}$ was required.

Part C

Significant Impact Analysis

An air quality analysis was performed to determine the significant ambient air quality impact of the proposed emission limitations for NO_2 and SO_2. The years 1990 through 1994 were modeled to determine the maximum impacts for both the short-term and long-term emission estimates. Results are in Table 2 below.

TABLE 2 - OAQ Modeling Results of Significant Impact Analysis (ug/m3)						
Pollutant	**Averaging Period**	**1990**	**1991**	**1992**	**1993**	**1994**
NO_2	Annual	0.110	0.106	0.072	0.086	0.098
SO2	3-hour	3.667	3.339	2.806	2.873	3.414
SO2	24-hour	0.780	0.681	0.673	0.801	0.818
SO2	Annual	0.052	0.051	0.034	0.040	0.048

Maximum modeled concentrations for each pollutant over its significant emission rate are summarized below in Table 3 and are compared to each pollutant's significant impact increments for Class II areas. No significant impacts were modeled and no further refined modeling is necessary.

TABLE 3 - Summary of Significant Impact Analysis for Beta Steel (ug/m3)				
Pollutant	**Year**	**Time-Averaging Period**	**Modeled Source Impacts**	**Significant Impact Increments**
NO_2	1990	Annual	0.110	**1.0**
SO_2	1990	3-hour	3.667	**25.0**
SO_2	1994	24-hour	0.818	**5.0**
SO_2	1990	Annual	0.052	**1.0**

Part D

Analysis of Ozone Impacts

VOC emission limits at Meltshop Baghouse stack increased by only 8.37 tons/year, which is below the 40 tons/year threshold. Therefore no analysis was performed for VOC.

Part E

Additional Impact Analysis

No additional impact analysis was performed for this request. The maximum modeled concentrations NO_2 and SO_2 are well below the threshold limits necessary to have adverse impacts on surrounding vegetation.

The nearest Class I area to the proposed power plant is the Mammoth Cave National Park located approximately 500 km south in Kentucky. Operation of Beta Steel will not adversely affect the visibility at this Class I area.

Beta Steel Corp.
Portage, IN
Modeler: K. Gremos

CP 127-9642
Plt ID 127-00036
05/30/03

Air Quality Analysis Addendum

Introduction

Beta Steel Corp. (Beta) has requested a revision to their Prevention of Significant Deterioration (PSD) permit (CP 127 2326 A 127 7005) to establish emissions limits which accurately reflect the capability for short-term and long-term operations at its facility near Portage, Porter County, Indiana. The site is located at Universal Transverse Mercator (UTM) coordinates 486569.0 East and 4608207.0 North. The proposed emission adjustments will occur at the Meltshop Baghouse stack for Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), Volatile Organic Compounds (VOCs) and Particulate Matter less than 10 microns (PM10). Porter County is designated as severe nonattainment for ozone and a portion of the county is unclassifiable/attainment for SO_2 and PM_{10}. Porter County is in attainment for all other criteria pollutants. The Office of Air Quality (OAQ) has performed this analysis to show whether or not the increase in SO2, NOx, and PM10 from the Meltshop Baghouse stack will adversely affect the Ambient Air Quality Standard (NAAQS) or Prevention of Significant Deterioration (PSD) increment.

The request for a revision to the Prevention of Significant Deterioration (PSD) permit (CP 127 2326 A 127 7005) was received by the Office of Air Quality (OAQ) on April 2, 2001 and forwarded to the Technical Support and Modeling Section on September 27, 2001. An additional amendment for PM10 was received in December of 2001. This document provides the Technical Support and Modeling Section 's review of the initial request and the subsequent amendment.

Executive Summary

NO_2, SO_2, and PM 10 emission limits were modeled to determine whether impact from both short-term and long-term limits will remain below significant levels as previous modeling conducted for Beta Steel has shown. No significant impact was modeled for these constituents. VOC emission limits at this stack increased by only 8.37 tons/year, which is below the 40 tons/year threshold. Therefore no analysis was performed for VOC. There will be no increase in Hazardous Air Pollutants (HAPs) emissions and no HAPs modeling is required. The closest Class I area is Mammoth Cave National Park in Kentucky. This lies outside the 100 km radius for Class I impact analysis.

Part A

Pollutants Analyzed for Air Quality Impact

IAC 2-2 PSD requirements apply in attainment and unclassifiable areas and require an air quality impact analysis of each regulated pollutant emitted in significant amounts by a major stationary source or modification. No physical changes or different methods of operations of the meltshop will occur as a result of this request. Beta's request is to establish NO_2, SO_2, and PM10 emissions limits reflective of the equipment currently operating at the site. Current permitted emission limits were revised from the original emission limits established in 1996. The 1996 emission limits were based on estimated emission factors, which have proved to be inaccurate. In Table 1, both current and proposed short and long-term emission factors are listed and were used to determine worst-case conditions.

Beta Steel Corp.
Portage, IN
Modeler: K. Gremos

CP 127-9642
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TABLE 1 - Proposed Short-Term/Long-Term Emission Limits for Beta Steel Meltshop				
Averaging Limit	**SO2 Emission Limits**	**NOx Emission Limits**	**VOC Emission Limits**	**PM10 Emission Limits**
Proposed Hourly Limit (lb/hr)	49.87	68.12	24.08	63.00
Current Hourly Limit (lb/hr)	5.92	22.2	16.6	59.86
Difference in Short-Term Limits (lb/hr)	**43.95**	**45.92**	**7.48**	**3.14**
Proposed Annual Limit (tons/yr)	218.3	298.08	105.47	275.40
Current Annual Limit (tons/yr)	25.9	97.1	97.1	261.65
Difference in Long-Term Limits (tons/yr)	**192.4**	**200.98**	**8.37**	**13.75**
Significant Emission Rates (tons/yr)	**40.0**	**40.0**	**40.0**	**15.0**

Part B

Modeling Analysis of Source Impact

The Office of Air Quality conducted modeling which used the Industrial Source Complex Short Term (ISCST3) model, Version 3, dated April 10, 2000 to determine maximum off-property concentrations or impacts for each pollutant. All regulatory default options were utilized in the United States Environmental Protection Agency (U.S. EPA) approved model, as listed in the 40 Code of Federal Register Part 51, Appendix W "Guideline on Air Quality Models**". Stacks associated with Beta Steel are below Good Engineering Practice (GEP) stack heights**. The aerodynamic downwash parameters were calculated using EPA's Building Profile Input Program (BPIP).

The meteorological data used in the ISCST3 model consisted of surface data from the City of South Bend merged with the mixing heights from Peoria, Illinois Airport National Weather Service Station for the five-year period (1990-1994). Meteorological data was obtained from the EPA Support Center for Regulatory Air Model electronic Bulletin Board and processed by PCRAMMET. OAQ modeling utilized Cartesian receptor grids out to 10 kilometers. Discrete receptors were placed 50 meters apart on Beta's property lines.

Part C

Significant Impact Analysis

An air quality analysis was performed to determine the significant ambient air quality impact of the proposed emission limitations for NO_2, SO_2, and PM10. The years 1990 through 1994 were modeled to determine the maximum impacts for both the short-term and long-term emission estimates. Results are in Table 2 below.

TABLE 2 - OAQ Modeling Results of Significant Impact Analysis (ug/m3)						
Pollutant	**Averaging Period**	**1990**	**1991**	**1992**	**1993**	**1994**
NO_2	Annual	0.110	0.106	0.072	0.087	0.099
SO2	3-hour	3.667	3.339	2.806	2.873	3.414
SO2	24-hour	0.780	0.681	0.673	0.801	0.818
SO2	Annual	0.052	0.051	0.034	0.040	0.048
PM10	24-hour	4.257	4.192	4.825	4.363	4.287
PM10	Annual	0.759	0.687	0.658	0.670	0.729

Maximum modeled concentrations for each pollutant over its significant emission rate are summarized below in Table 3 and are compared to each pollutant's significant impact increments for Class II areas. No significant impacts were modeled and no further refined modeling is necessary.

TABLE 3 - Summary of Significant Impact Analysis for Beta Steel (ug/m3)				
Pollutant	**Year**	**Time-Averaging Period**	**Modeled Source Impacts**	**Significant Impact Increments**
NO_2	1990	Annual	0.110	**1.0**
SO_2	1990	3-hour	3.667	**25.0**
SO_2	1994	24-hour	0.818	**5.0**
SO_2	1990	Annual	0.052	**1.0**
PM10	1992	24-hour	4.825	**5.0**
PM10	1990	Annual	0.759	**1.0**

Part D

Analysis of Ozone Impacts

VOC emission limits at Meltshop Baghouse stack increased by only 8.37 tons/year, which is below the 40 tons/year threshold. Therefore no analysis was performed for VOC.

Part E

Additional Impact Analysis

No additional impact analysis was performed for this request. The maximum modeled concentrations NO_2, SO_2, and PM10 are below the threshold limits necessary to have adverse impacts on surrounding vegetation.

The nearest Class I area to the proposed power plant is the Mammoth Cave National Park located approximately 500 km south in Kentucky. Operation of Beta Steel will not adversely affect the visibility at this Class I area.